IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.
6. The copier is not attached to the table. Pushing the copier too heard may cause it to drop onto the floor. While moving the copier, push the table.
7. When the main switch is tuned on, the machine will suddenly start turning to perform the developer initialization. Keep hans away from any mechanical and electrical components during this period.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.

⚠ CAUTION

2. The RAM board on the main control board has a lithium battery which can explode if replaced incorrectly. Replace the RAM board only with an identical one. The manufacturer recommends replacing the entire RAM board. Do not recharge or burn this battery. Used RAM board must be handled in accordance with local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate the toner cartridge or the used toner. Toner dust may ignite suddenly when exposed to open flame.
2. Dispose of used toner, developer, and organic photoconductor according to local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used RAM boards in order to dispose of them later, do not put more than 100 RAM boards per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

SECTION 1

OVERALL
MACHINE INFORMATION

1. SPECIFICATIONS

Configuration:	Console
Copy Process:	Electrostatic transfer system
Original Feed:	Sheet feed
Original Size:	Maximum: 914 x 3,600 (36" x 142")mm Minimum: 182 x 257 (B5), 8 1/2" x 11" lengthwise
Copy Size:	Same as "Original Size"
Copying Speed:	7.5 cpm (A1/D sideways)
First Copy:	18 seconds (A1/D sideways)
Warm-up Time:	Within 6 minutes (Room temperature 23°C)
Multi-Copy:	1 to 10
Automatic Reset:	2 minutes after copying is finished (can be set to 1, 3, 4, or 5 minutes or to no auto reset)
Photoconductor:	Organic photoconductor drum
Drum Charge:	Single-wire with grid plate (Negative Charge)
Reproduction Ratio:	1 : 1 (±0.5%)
Exposure System:	Slit exposure via fiber optic array
Exposure Lamp:	Fluorescent lamp (26 W)
Development:	Dual-component dry toner system
Toner Replenishment:	Cartridge system (750 g toner/cartridge)
Toner Consumption:	1,860 A1 or D copies per cartridge (6% original)
Development Bias:	Negative
Toner Density Control:	Direct toner density detection by induction sensor
Image Density Adjustment:	Development bias control + exposure control
Auto Image Density Control:	Development bias control + exposure control
Paper Separation:	Dual wire ac corona and pick-off pawls
Cleaning:	Cleaning blade

Paper Feeding:	Manual feed and 2 roll feeds (3rd roll feeder optional)
Image Fusing:	Heat and pressure type, teflon (upper) and silicone rubber (lower) rollers
Fusing Lamp:	Halogen lamp (115 V: 1,100 W, 230 V: 1,100 W)
Self-diagnostic Codes:	18 codes, displayed in copy counter
Power Source:	115 V/60 Hz....12 A 220 V/50 Hz....7 A 230 V/50Hz.....7 A 240 V/50 Hz....7 A
Power Consumption:	Maximum: 1.41 kW Warm-up: 1.21 kW Ready: 0.1 to 1.2 kW Copy cycle: 1.36 kW
Dimensions (W x D x H):	1230 x 690 x 1065 mm 48.4" x 27.2" x 41.9"
Weight:	195 kg, 429 lb

Optional Equipment and Machine Configuration

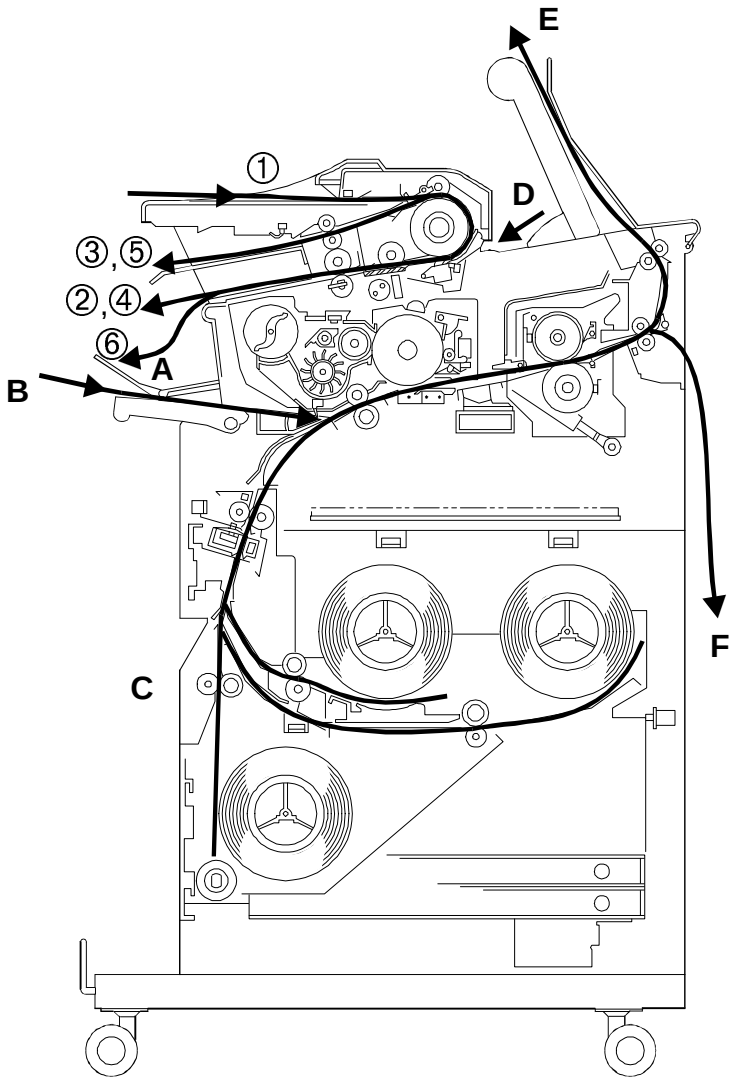
Configuration		Additional equipment
Main frame	Optional equipment	
A174 copier	3rd Roll feeder (A613)	–
	Side guides (A569)	–

Other Optional Equipment

- Paper Spool (Spare parts)
- Key Counter Bracket Set (A902-15)
- Key Counter (Procured locally)
- Key Counter Holder (Procured locally)

Specifications are subject to change without notice.

2. PAPER PATH



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A: Original Path ②, ③, ④, ⑤: Switching back

B: Paper from the manual feed

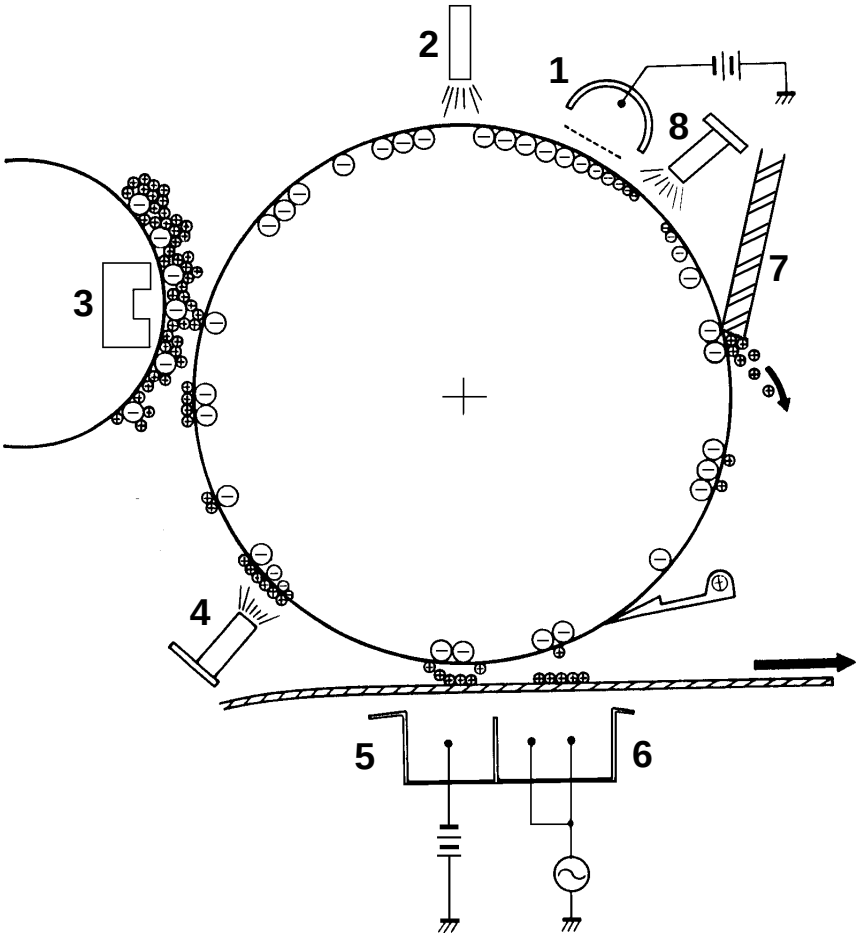
C: Paper from the roller feed

D: Original Path from Rear Feeder

E: Upper Copy Exit

F: Lower Copy Exit

3. DRUM PROCESSES



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1. Charge

In the dark the charge corona unit applies a negative charge to the drum. The grid plate ensures the charge is applied uniformly. The charge remains on the surface of the drum because the photoconductive drum has a high electrical resistance in the dark.

2. Exposure

High intensity light from a fluorescent lamp is reflected from the moving original through the fiber optic array. The charge on the drum surface is dissipated in direct proportion to the intensity of the reflected light, thus producing an electric latent image on the drum surface.

3. Development
The magnetic developer brush on the development roller comes in contact with the latent image on the drum surface. Toner particles are electrostatically attracted to the negatively charged latent image areas.

4. Pre-Transfer Lamp
The pre-transfer lamp (PTL) illuminates the drum prior to image transfer. This reduces the attraction between the toner and the drum, thus making image transfer easier.

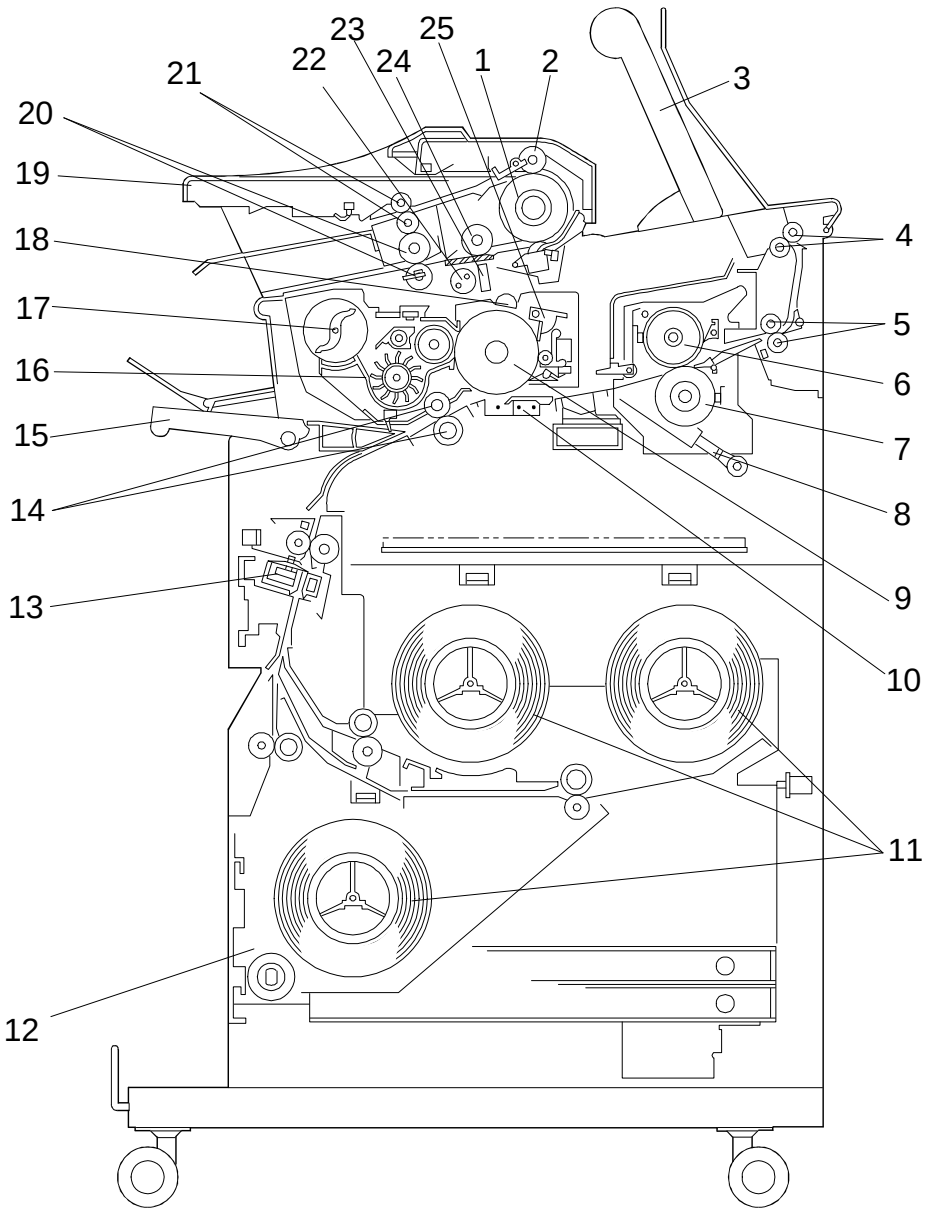
5. Image Transfer
Copy paper is fed to the drum surface, at the exact timing, to align the copy paper and the developed image on the drum surface. Then a strong negative charge is applied to the back side of the paper. The negative charge pulls the toner particles from the drum surface onto the paper.

6. Paper Separation
A strong ac corona discharge is applied to the back side of the copy paper, reducing the charge on the paper and breaking the electrostatic attraction between the paper and the drum. Then, the stiffness of the copy paper causes it to separate from the drum. The pick-off pawls help to separate paper which has low stiffness.

7. Cleaning
The cleaning blade, which is angled against drum rotation (counter blade system), removes any toner remaining on the drum surface.

8. Quenching
The light from the quenching lamp electrically neutralizes the surface of the drum.

4. MECHANICAL COMPONENT LAYOUT



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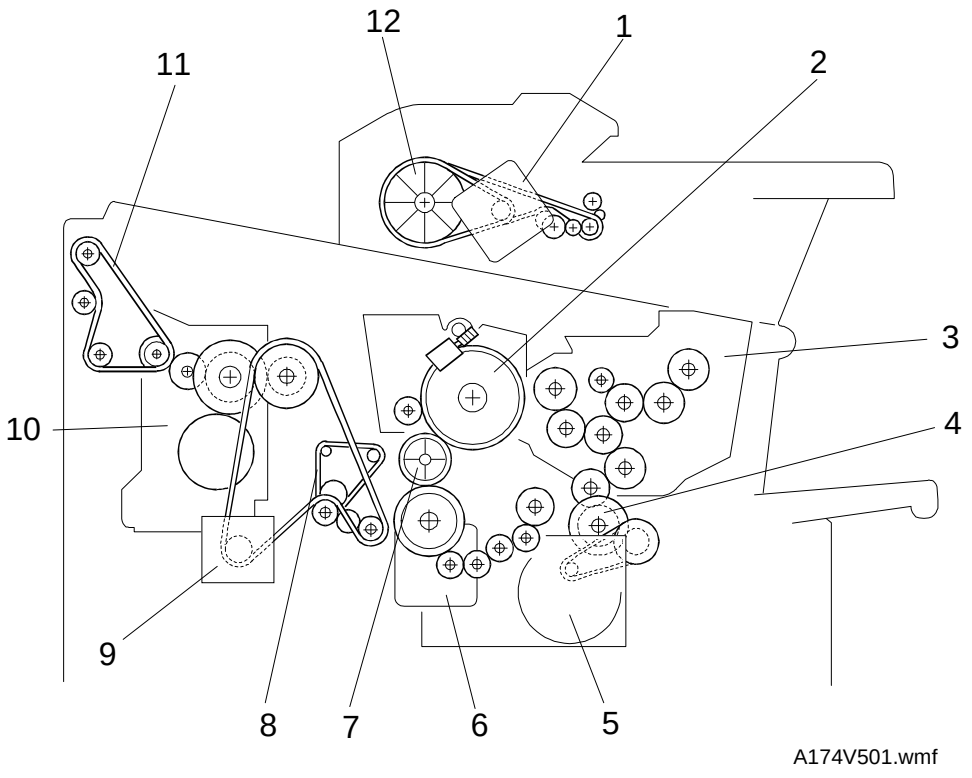
1. Original Registration Roller
2. Original Feed Roller
3. Copy Tray
4. Exit Rollers
5. Fusing Exit Rollers
6. Hot Roller
7. Pressure Roller
8. Gas Spring
9. OPC Drum
10. T/S Corona Unit
11. Paper Spool
12. 3rd Roll Feeder
13. Cutter Unit
14. Paper Registration Rollers
15. Manual Feed Table
16. Development Unit
17. Toner Cartridge
18. Charge Corona Unit
19. Original Table
20. Original Exit Rollers
21. Original Repeat Roller
22. Exposure Lamp
23. Fiber Optic Array
24. Platen Roller
25. Cleaning Blade

5. DRIVE LAYOUT



1. Original Feed Motor
2. Drum
3. Development Unit
4. Development Relay Gear
5. Development Motor
6. Main Motor
7. Drum Drive Relay Gear
8. Transport Unit Drive Belt
9. Fusing Drive Motor
10. Fusing Unit
11. Exit Unit Drive Belt
12. Original Feed Drive Pulley

6. ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout on the reverse side of the Point to Point (Water proof paper) index numbers.

Name	Function	Index No.
Motor		
Main Motor	Drives the drum and the registration roller. (dc motor)	20
Development Motor	Drives the development unit components. (dc motor)	22
Fusing Drive Motor	Drives the fusing unit components. (dc motor)	2
Original Feed Motor	Drives original feed rollers. (dc motor)	25
Roll Feed Motor	Drives the 1st, 2nd and 3rd roll feed rollers. (dc motor)	52
Cutter Motor	Drives the roll cutter. (dc motor)	56
Exhaust Fan Motor	Removes the ozone built up around the drum section to the ozone filter. (dc motor)	7
Vacuum Motor 1	Provides suction so paper is held firmly on the transport belt.	19
Vacuum Motor 2	Provides suction so paper is held firmly on the transport belt.	10
Wire Cleaner Motor	Drives the wire cleaner.	24
Magnetic Clutches		
Roll Feed Clutch 1	Transmits the roll feed motor drive to the 1st roll feed roller.	55
Roll Feed Clutch 2	Transmits the roll feed motor drive to the 2nd roll feed roller.	58
Roll Feed Clutch 3	Transmits the roll feed motor drive to the 2nd roll feed roller.	54
Registration Clutch	Transmits the main motor drive to the registration roller.	23
Toner Supply Clutch	Turns on to supply toner to the development unit.	21
Solenoids		
Pick-off Pawl Solenoid	Moves the pick-off pawls against the drum.	66
Exit Gate Solenoid	Moves the exit gate to change paper path.	12
Original Gate Solenoid	Moves the original gate to change original path.	1
Switches		
Main Switch	Supplies power to enable copy operation.	37
Exit Cover Open Switch	Detects whether the exit cover is open or not.	33
Left Cutter Switch	Detects whether the cutter unit is at the left home position or not.	57
Right Cutter Switch	Detects whether the cutter unit is at the right home position or not.	50
3rd Roll Feed Door Open Switch	Detects whether the 3rd roll feed door is open or not.	53
Upper Unit Safety Switch	Cuts ac power when the upper unit is open.	38

Name	Function	Index No.
Exit Cover Safety Switch	Cuts ac power when the exit cover is open.	34
Anti-humidify Heater Switch	Supplies power to the anti-humidify heater.	49
Roll Feed Unit Safety Switch	Cuts dc power when the roll feed unit is open.	59
Anti-humidify Heater Safety Switch	Cuts power to the anti-humidify heater when the roll feed unit is open.	48
Sensors		
Upper Unit Open Sensor	Detects whether the upper unit is open or not.	45
ADS Sensor	Senses the background density of the original.	61
Fusing Exit Sensor	Detect paper jams after the registration sensor.	8
Roll Lead Edge Sensor	Detects the leading edge and trailing edge of the paper fed from the roll feeder.	60
Roll End sensor 1	Detects the roll end condition of the 1st roll.	42
Roll End sensor 2	Detects the roll end condition of the 2nd roll.	28
Roll End sensor 3	Detects the roll end condition of the 3rd roll.	54
Original Exit Sensor 1	Detects jams in the original exit section.	14
Original Exit Sensor 2	Detects jams in the original exit section.	3
Original Exit Sensor 3	Detects jams in the original exit section.	18
Original Lead Edge Sensor	Detects the original leading edge to determine the copy process timing.	6
Original Switch Back Sensor	Detects original jams in the repeat copy.	4
Original Set Sensor	Detects when an original is inserted from the front side.	5
Original Feed Unit Open Sensor	Detects whether the original feed unit is open or not.	47
Original Registration Sensor	Detects the leading edge of the original to synchronize the original leading edge with the copy paper.	62
Light Sensor	Detects the intensity of the exposure lamp output.	27
Rear Original Set Sensor	Detects when an original is inserted from the rear side.	9
Toner Density (TD) Sensor	detects the density of toner in the developer.	15
Paper Set Sensor	Detects when a sheet of paper is set on the by-pass feed table.	16
Registration Sensor	Detects when copy paper arrives at the registration roller. Detects paper jams.	17
Toner Overflow Sensor	Detects whether the used toner bottle is full or not.	36

Name	Function	Index No.
Printed Circuit Boards		
Main Board	Controls all copier functions both directly and through other PCBs.	44
AC Drive Board	Provides ac power to the lamps, heaters, and PSU.	39
PSU	Converts the ac voltage to dc voltage.	43
Operation Panel	Informs the CPU of the selected modes, and displays the situation on the panel.	11
Lamps		
Exposure Lamp	Provides light to reflect the original' image onto the lamp. (fluorescent lamp)	26
Fusing Lamp	Provides heat to the hot roller.	32
Pre-transfer Lamp (PTL)	Reduces the charge on the drum surface prior to image transfer.	13
Quenching Lamp (QL)	Neutralizes any charge remaining on the drum surface after cleaning.	65
Power Packs		
Charge/Bias/Grid Power Pack	Provides high voltage for the charge corona, grid and development bias.	40
T & S Power Pack	Provides high voltage for the transfer corona and separation.	30
Thermistors		
Hot Roller Thermistor	Monitors the hot roller surface temperature.	29
Pressure Roller Thermistor	Monitors the pressure roller surface temperature.	33
Heaters		
Anti-humidity Heater	Removes humidity from the roll paper.	63
Anti-condensation Heater	Prevents moisture from forming inside the copier.	64
Others		
Fusing Thermofuse	Protects against fusing overheat.	31
Total Counter	Keeps track of the total length of copies made (Europe) or total number of copies made (U.S.A.).	46
Noise Filter	Filters electrical noise on the ac power input lines.	35
FL Regulator	Stabilizes the power supplement to the exposure lamp.	41

SECTION 2

DETAILED SECTION DESCRIPTIONS

1. DRUM

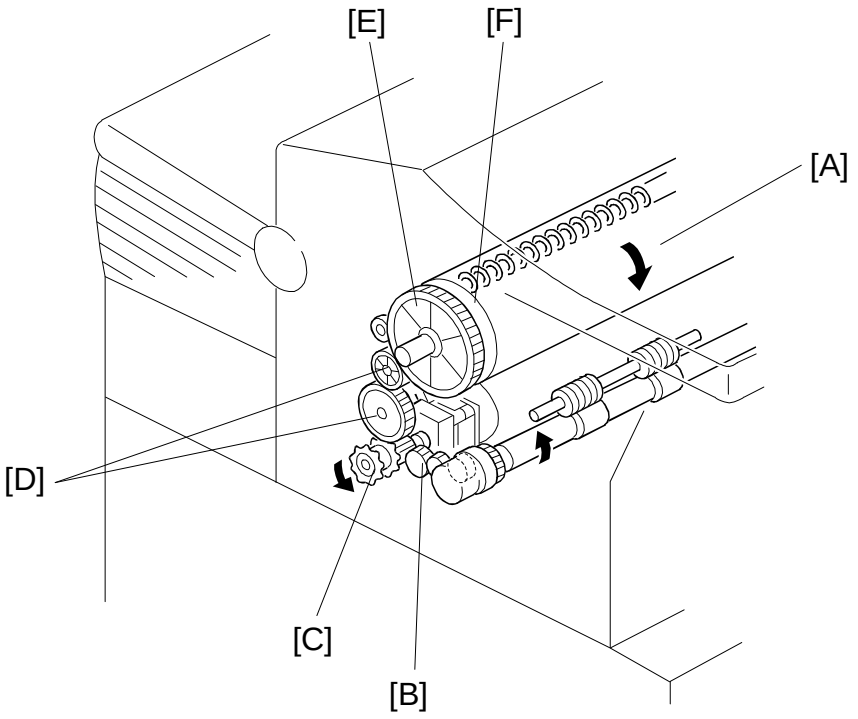
1.1 DRUM CHARACTERISTICS

The organic photoconductor (OPC) drum has the following characteristics:

- It is able to accept a high negative electrical charge in the dark. (The electrical resistance of the OPC drum is high in the absence of light.)
- The electric charge on the drum surface dissipates when the drum is exposed to light. (The conductivity of the OPC drum is greatly enhanced by exposure to light.)
- It dissipates an amount of charge that is in direct proportion to the intensity of the light. That is, where stronger light is directed to the photoconductor surface, a smaller voltage remains.

The OPC drum used in this model has high sensitivity, good color reproduction, and good reproduction of low contrast originals (pencil originals, etc.)

1.2 DRUM DRIVE



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The OPC drum [A] is 80 millimeters in diameter and 970 millimeters long. It turns constantly when the main motor [B] is on.

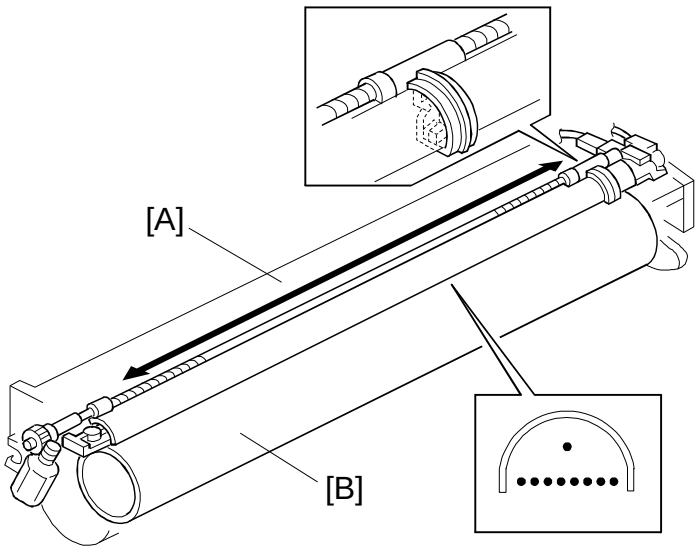
When the main motor turns on, the drive is transmitted to the drum in the following way:

main motor drive gear [C] ⇒ idle gears [D] ⇒ drum drive gear [E] ⇒ drum flange [F] ⇒ drum

When the drum knob is tightened, the right flange presses firmly against the drum so that the drum is held tightly between the flanges. The drum and flanges turn together when the main motor is on.

2. CHARGE

2.1 OVERVIEW



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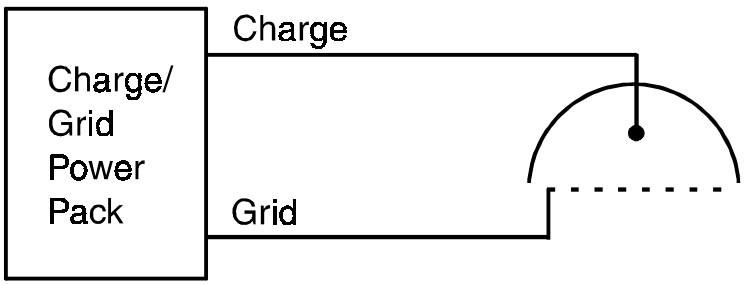

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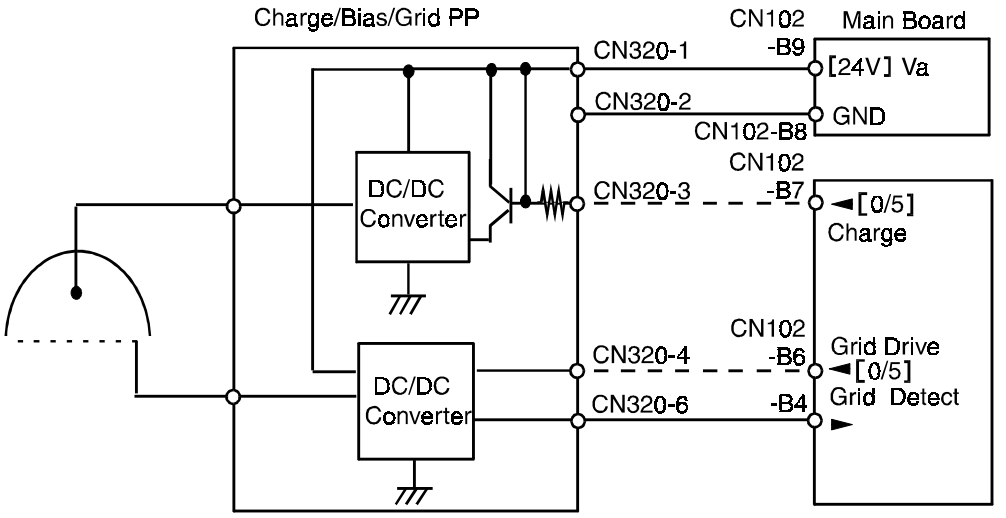
This model uses a single wire corona unit [A] to charge the OPC (organic photoconductor) drum [B]. The corona unit generates a corona of negative ions when a high negative voltage is applied to it by the charge/grid power pack.

To make the negative corona uniform, a grid consisting of 8 wires is installed on the charge corona unit between the corona wire and the drum. This grid drains off any charge in excess of –860 volts, thus preventing fluctuation of the charge potential.

2.2 CHARGE CORONA CIRCUIT



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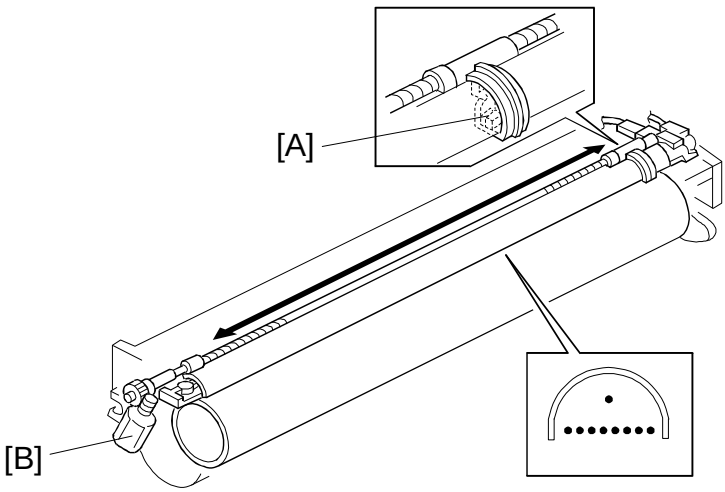
The main board supplies +24 volts (V_{AA}) to the charge/bias/grid power pack as the power supply source. Approximately 12 seconds after the copy process starts, the CPU drops CN102-B7 from 5 volts to 0 volts. This actuates the dc/dc converter within the power pack which applies a high negative voltage of approximately –5.0 kV to the charge corona wire. The corona wire then generates a negative corona charge.

The grid limits the maximum corona charge to –860 volts. This ensures that the charge does not fluctuate and an even charge is applied to the drum surface.

The copy grid voltage and charge voltage amounts can be adjusted using SP# –14 and SP#–13 respectively.

The grid drive signal applied to CN320-4 is a pulse width modulated signal. As the width of the pulses applied increases, the strength of the grid charge also increases. The main board monitors the grid charge at CN102-B4 and controls the width of the drive pulses based on this feedback.

2.3 CHARGE WIRE CLEANING MECHANISM



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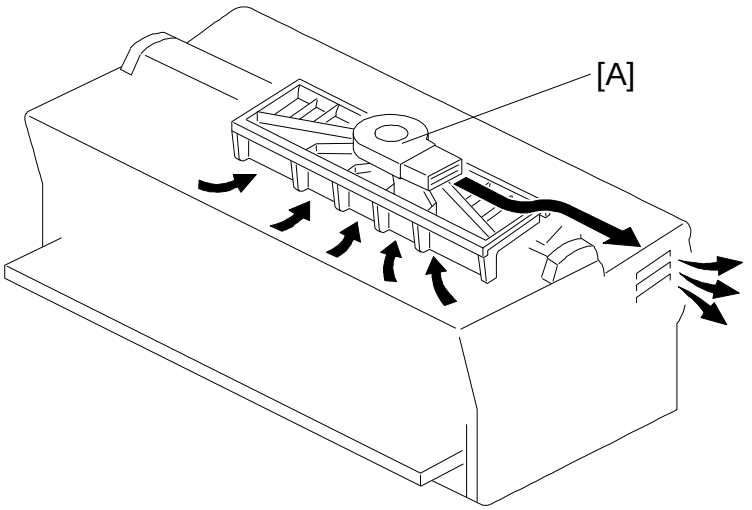
The wire cleaner pads [A] automatically clean the wires every 297 m (500 copies/A1).

The wire cleaner is driven by a dc motor [B]. Normally the wire cleaner is located at the front end position (home position). After 297 m (500 copies/A1) or more copies are made and fusing temperature is less than 100°C after the main switch is turned on, the wire cleaner motor turns on to bring the wire cleaner to the rear end and then back to the home position.

When the wire cleaner moves from the rear to the home position, the wire cleaner pads clean the wires.

There are no home position and return position sensors. The CPU monitors the input voltage (5 V). When the wire cleaner reaches the end, it is stopped and the motor is locked. At this time, input voltage slightly decreases (to about 4 V) and the CPU judges to rotate the motor in reverse.

2.4 CORONA UNIT VENTILATION



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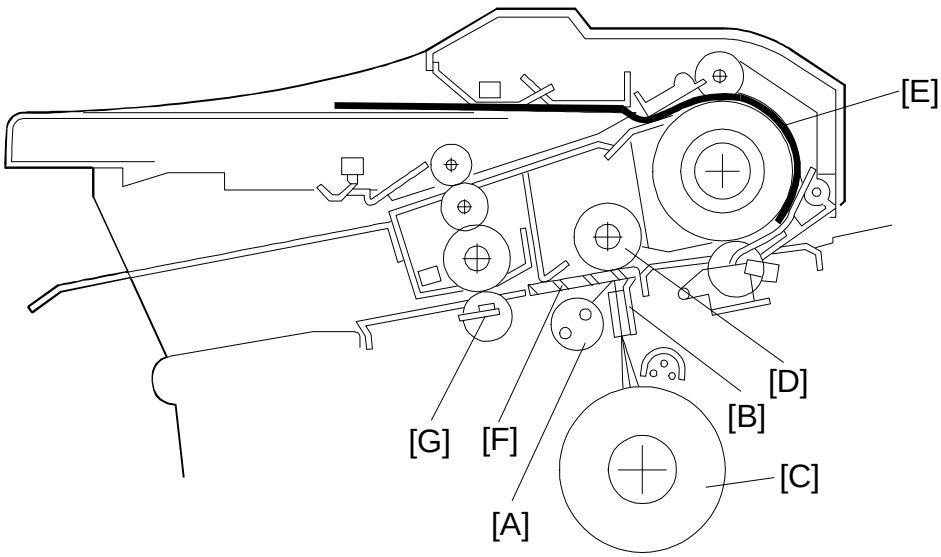
If ozone produced by the corona charge stays in the charge corona area, it may cause uneven corona charging to the drum. To prevent this, ozone is vacuumed out through the exhaust fan [A], and changed to oxygen by the ozone filter before being blown out of the copier.

3. EXPOSURE

3.1 OVERVIEW



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Light from the exposure lamp [A] reflects off the original and through the fiber optics [B] to the OPC drum [C]. During exposure, the original moves across the exposure glass at the same speed as the drum's peripheral velocity.

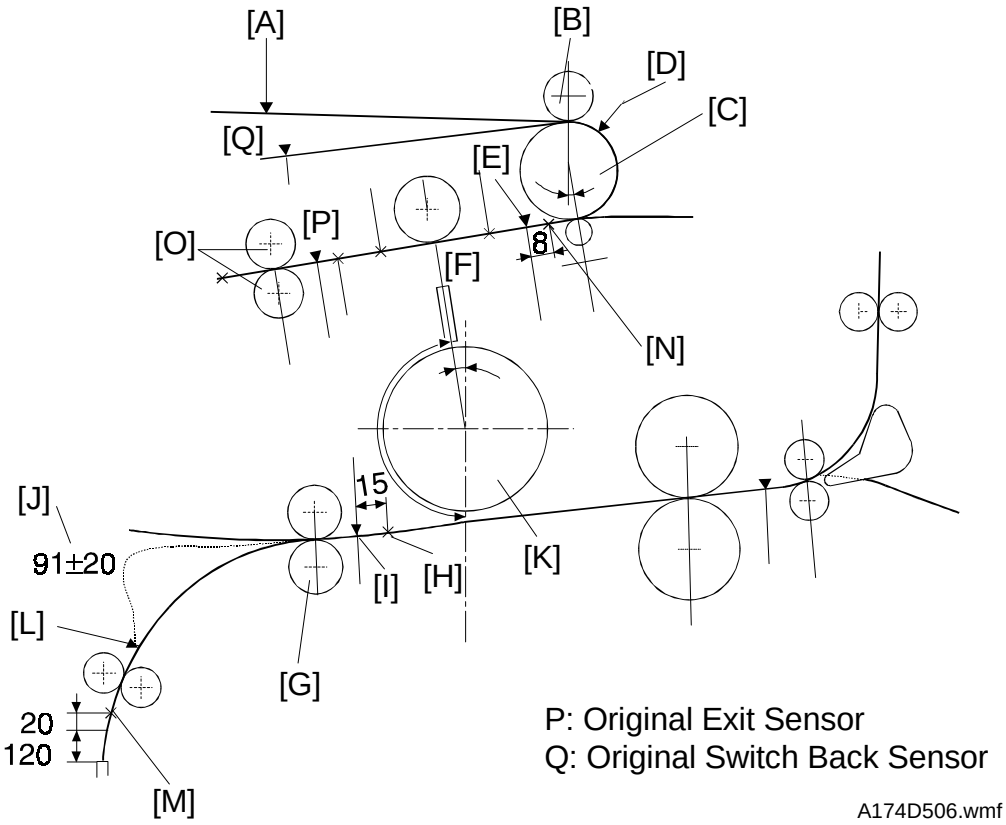
The platen roller [D] presses the original [E] flat against the exposure glass [F] just above the fiber optic array. This ensures that the image is properly focused. (The original must be within 0.2 mm of the exposure glass surface.)

The exposure lamp is a 125 V, 37 W exposure lamp.

The light sensor [G] monitors the intensity of the exposure lamp output.

3.2 PAPER AND ORIGINAL FEED

3.2.1 Normal Original Feed



When an original is placed on the original table, it activates the original set sensor [A]. The main motor and development motor start rotating and the exposure lamp turns on. 2.5 seconds later, the original feed motor starts rotating to turning the original feed roller [B] and the original registration roller [C]. An original feed starts. The 2.5 second delay allows time for the operator to align the lead edge of the original against the first set of rollers to prevent skew.

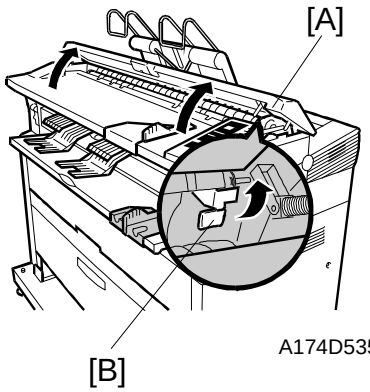
When the original lead edge sensor [D]detects the leading edge of the original, the roll feed motor and the roll feed clutch turn on, and paper feed starts. The original is fed to the original registration sensor [E] and stops at 33 mm [F] ahead of the original registration sensor to wait for the copy paper. The registration clutch is activated at the appropriate time after paper feed begins. The copy paper is fed to the registration roller [G] and the registration clutch turns off when the copy paper reaches 15 mm [H] ahead of the registration sensor [I]. The speed of the roll feed motor is increased from 90 mm/s to 162 mm/s to form a paper buckle [J]. Then, the speed of the roll feed motor returns to 90 mm/s and the registration clutch turns on again. The paper feed resumes and the copy paper is transported to the drum [K].
At the appropriate time, the original feed motor rotates again and the original is delivered to the exposure glass.

To measure the original length for synchro-cutting, the copier CPU counts the time after the original lead edge sensor [D] detects the leading edge of the original until the original set sensor [A] detects the trailing edge of the original. The copy paper length is measured by counting the number of steps as the roll feed motor (stepper motor) turns. The roll feed motor stops at the appropriate time and the cutter motor rotates to cut the copy paper.
Repeat copies

When making repeat copies, to increase the CPM, the roll feed motor starts rotating 0.22 s after the roll lead edge sensor [L] is de-activated and advance the copy paper 20 mm [M] (140 mm ahead of the paper feed start position). After the 1st copy job, at the appropriate time after the trailing edge of the original passes the original registration sensor [E], the original feed motor rotates reverse 3.6 times as fast as the normal speed. The original is returned to the position [N] where the leading edge of the original is 8 mm before the original registration sensor.

When the leading edge of the original passes the original registration sensor, the original feed motor rotates forwards again and the original is delivered to the exposure glass and the copy job is repeated at the trigger timing. After all the repeat copies have been made, the original is fed out.
After original scanning, the original can be stopped and caught by the original exit rollers [O] or it can be fed out without being caught in the original exit rollers. This is determined by SP No.24 (Original Hold mode). If the original hold mode is selected, the original is fed out when the Clear/Stop key is pressed or the next original is inserted.

3.2.2 CHANGING MODE TO LONG NARROW ORIGINALS



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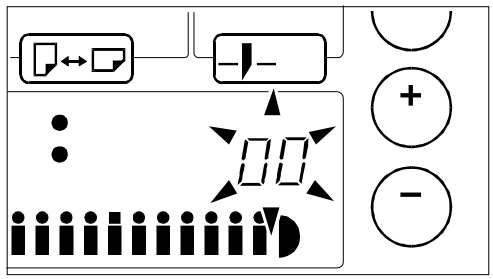

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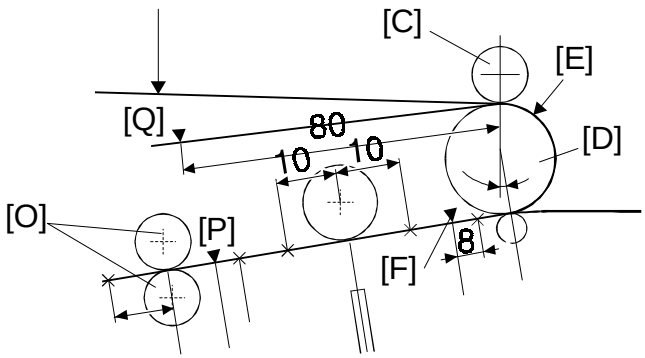

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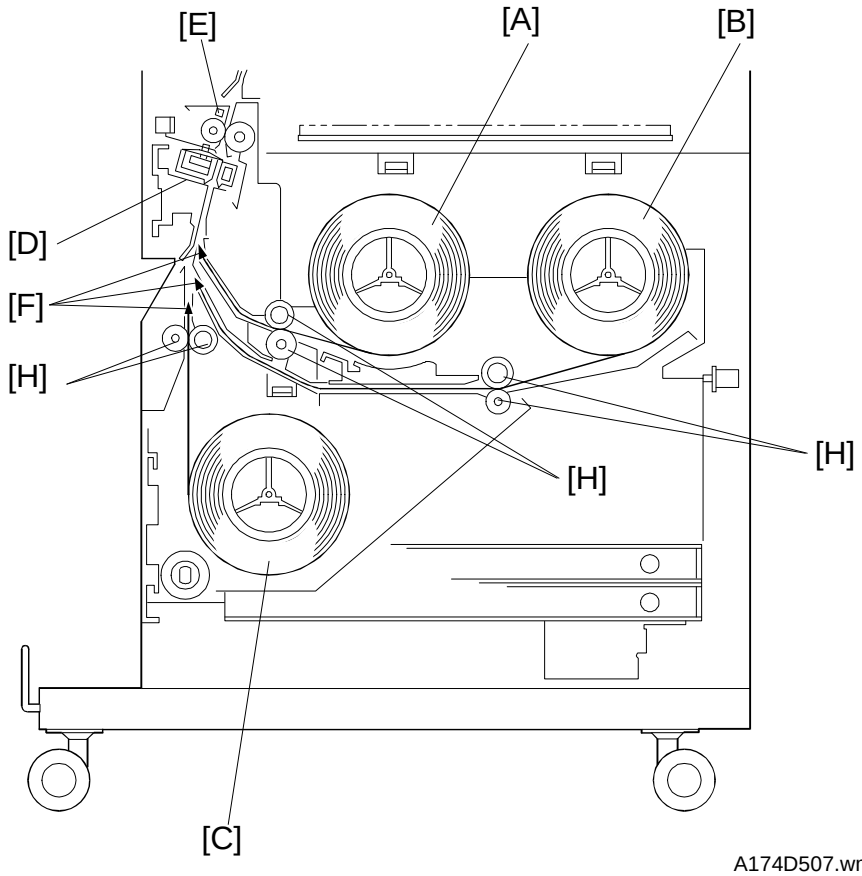
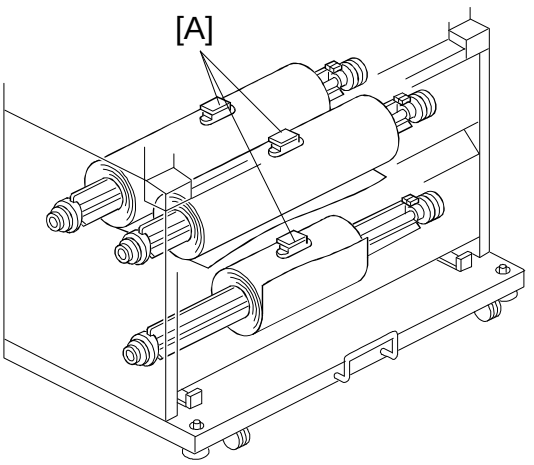
If the original width is less than 515 mm (18'') and it is longer than the standard paper size (A0/E size), the original may be skewed by the middle four of the 8 original feed rollers. The copy image may be warped. For such originals, the "long narrow original" feed mode can be selected. In this mode, the middle four original feed rollers are released while inserting the original.
When the original feed cover [A] is opened and the green lever at the right [B] is pulled front, the middle four original feed rollers [C] are released from the original registration roller [D]. This release condition of the middle four original feed rollers is detected by the original mode change sensor in the rear feed table assembly.
When the original cover is closed, "00" is blinking on the copy counter to distinguish this mode from the normal original feed mode.
In this mode the detection of the original leading edge by the original lead edge sensor [E] is used as a starting trigger of the main motor, development motor, and exposure lamp. 3 seconds later, the original registration roller delivers the original to the exposure glass. To measure the original length for synchro-cutting, the copier CPU counts the time after the original registration sensor [F] detects the leading edge of the original until the original lead edge sensor detects the trailing edge of the original.
The repeat copy function cannot be used in this mode.

3.3 ROLL FEED



This machine has two standard roll feed units (1st [A] and 2nd [B]), one manual feed unit, and one optional roll feed unit (3rd [C]). The cutter unit [D] uses a sliding rotary cutting blade.
When turning on the main switch or when roll paper is replenished, the roll feed motor rotates and the leading edge of the roll paper is fed until the roll lead edge sensor [E] is activated. Then, the leading edge of the roll paper is returned to the paper feed start position (120 mm before the cutter unit) [F].

3.3.1 Roll End Detection



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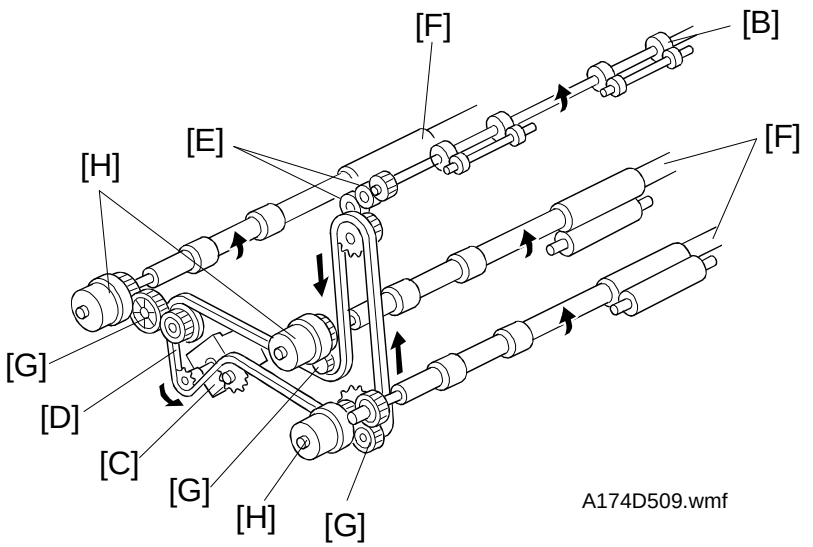
The roll paper end sensor [A] is located above each roll. When the roll paper runs out and the roll paper end sensor detects the black core of the roll, roll end is indicated on the operation panel. If the paper is not caught by the pull-out rollers [H] (previous page), paper feed fails. In this case, roll end is indicated instead of a paper misfeed indication.

3.3.2 Drive Mechanism



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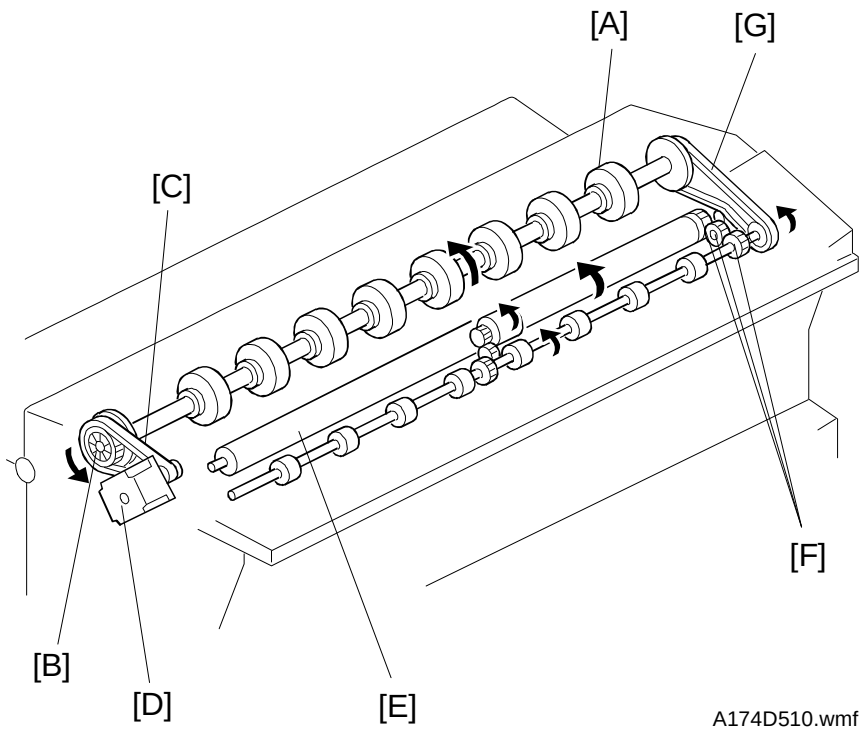
The roll feed roller [B] is driven by the roll feed motor [C] through the chain [D] and gears [E]. The pull-out roller [F] of each roll feed unit is driven by the roll feed motor through the chain and each gear [G] and each roll feed clutch [H].

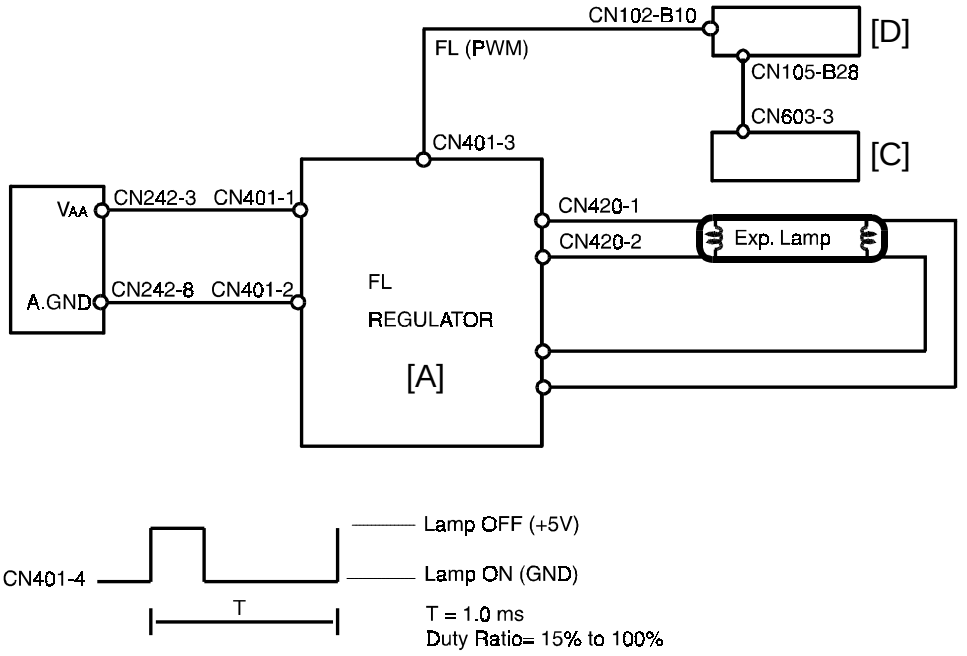
3.3.3 Drive Mechanism



The original feed roller [A] is driven through the original feed drive pulley [B] and belt [C] by the original feed motor [D].

The platen roller [E] is rotated by the original feed motor [D] through the gears [F] and belt [G].

3.4 FL REGULATOR CONTROL



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The FL regulator [A] receives 24 volts dc at CN401-1 from the main board [B]. The control signal, which is a pulse width modulated (PWM) signal, is received at CN401-3. The PWM signal has a period (T) of 1 millisecond and a duty ratio of 15% to 100%.

The basic light intensity level is determined either by the image density selected at the operation panel (manual ID control) or by the original's background level as sensed by the ADS. The CPU uses the light sensor to monitor the actual light intensity. The light sensor [C] directly detects the lamp's light output and feeds a light intensity signal back to CN105-B28 of the main board [D]. This feedback allows the CPU to compensate for variations in light intensity due to the lamp's age or temperature.

3.5 MANUAL ID CONTROL VS ADS

Manual ID Level	Light Sensor Output [V]	Manual ID Level	Light Sensor Output [V]
1	1.275	14	1.882
2	1.275	15	1.922
3	1.275	16	2.020
4	1.294	17	2.118
5	1.294	18	2.216
6	1.314	19	2.314
7	1.333	20	2.412
8	1.373	21	2.529
9	1.412	22	2.627
10	1.510	23	2.725
11	1.627	24	2.824
12	1.745	25	2.922
13	1.843	26	3.118

3.5.1 Manual ID Control

When in manual image density mode, the user can select one of 26 manual ID levels. For each level, the intensity of the light output by the exposure lamp (as measured by the light sensor) is fixed. This is shown in the above table. The development roller bias also varies. (See the section on development bias.)

3.5.2 ADS Control

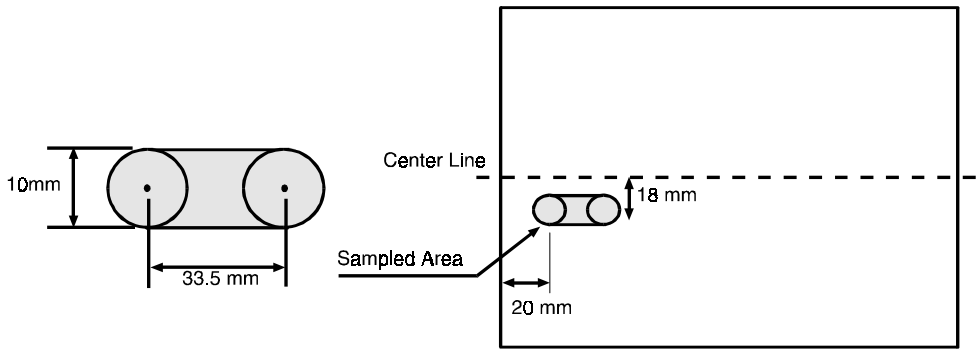
VOD/VSD	VS [V]	VOD/VSD	VS [V]
0~0.45	3.118	0.64~0.65	2.020
0.46~0.47	2.922	0.66~0.67	1.922
0.48~0.49	2.824	0.68~0.69	1.882
0.50~0.51	2.725	0.70~0.71	1.843
0.52~ 0.53	2.627	0.72~0.73	1.745
0.54~0.55	2.529	0.74~0.75	1.627
0.56~0.57	2.412	0.76~0.80	1.510
0.58~0.59	2.314	0.81~0.84	1.412
0.60~0.61	2.216	0.85~0.88	1.373
0.62~0.63	2.118	0.89~	1.333

VS: Light Sensor Voltage
VOD: Original Density Detecting Voltage
VSD: Standard Pattern (White Plate) Density Detecting Voltage

When automatic image density sensing (ADS) is used, the exposure light intensity varies depending on the background image density of the original. The preceding table shows how the exposure light intensity changes depending on the VOD/VSD ratio.

Use user program mode to select the default ID setting. It can be set to ADS or Manual ID. The factory setting is ADS.

3.6 AUTO DENSITY SENSOR (ADS)



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The ADS measures the reflectivity of the original's background. Based on the originals background image density, the CPU automatically adjusts the development bias and exposure light intensity to achieve a good copy image.

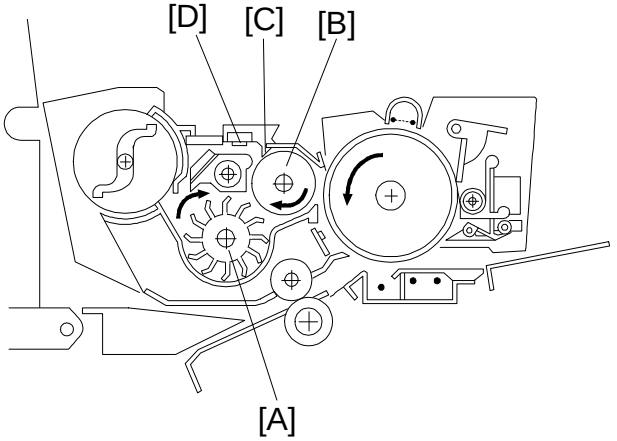
The ADS is located at the original registration rollers. It reads the reflectivity of the white plate by emitting light from ADS (standard white), which is located above the ADS, prior to the arrival of the original. This standard white level (VSD) is used for comparison with the background level of the original (VOD).

The ADS samples a 43.5 mm by 10 mm area near the leading edge of the original. As shown in the above illustration, sampling starts 15 mm from the leading edge.

The highest voltage detected by the ADS is held (peak hold) and used for the exposure voltage adjustment.

4. DEVELOPMENT

4.1 OVERVIEW



A174D512.wmf

When the development motor turns on, the paddle roller [A] and development roller [B] start turning. The paddle roller picks up developer in its paddles and transports it to the development roller. Internal magnets in the development roller attract the developer to the development roller sleeve.

The turning sleeve of the development roller then carries the developer past the doctor blade [C]. The doctor blade trims the developer to the desired thickness and creates backspill to the cross-mixing mechanism.

The development roller continues to turn, carrying the developer to the OPC drum. When the developer brush contacts the drum surface, the negatively charged areas of the drum surface attract and hold the positively charged toner. In this way, the latent image is developed.

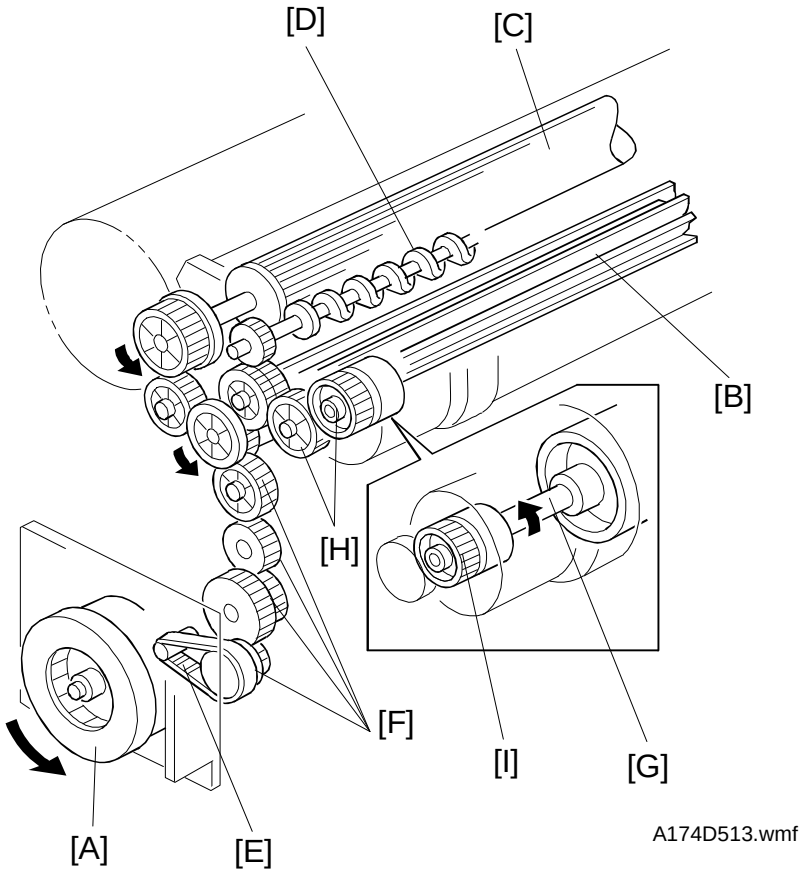
Negative bias is applied to the development roller to prevent toner from being attracted to non-image areas on the drum that may have residual positive charge. The bias also controls image density.

After turning about 100 degrees more, the development roller releases the developer into the developer tank. The developer is agitated by the paddle roller and the cross-mixing mechanism.

Also, in this machine, rotation of the paddle roller and development roller tend to cause the air pressure inside the unit to become higher than the air pressure around the development unit. Therefore, a hole fitted with a filter has been added to the top of the unit to relieve air pressure and to minimize toner scattering.

The toner density sensor [D] is mounted on the upper side of the development unit to detect the density of toner in the developer.

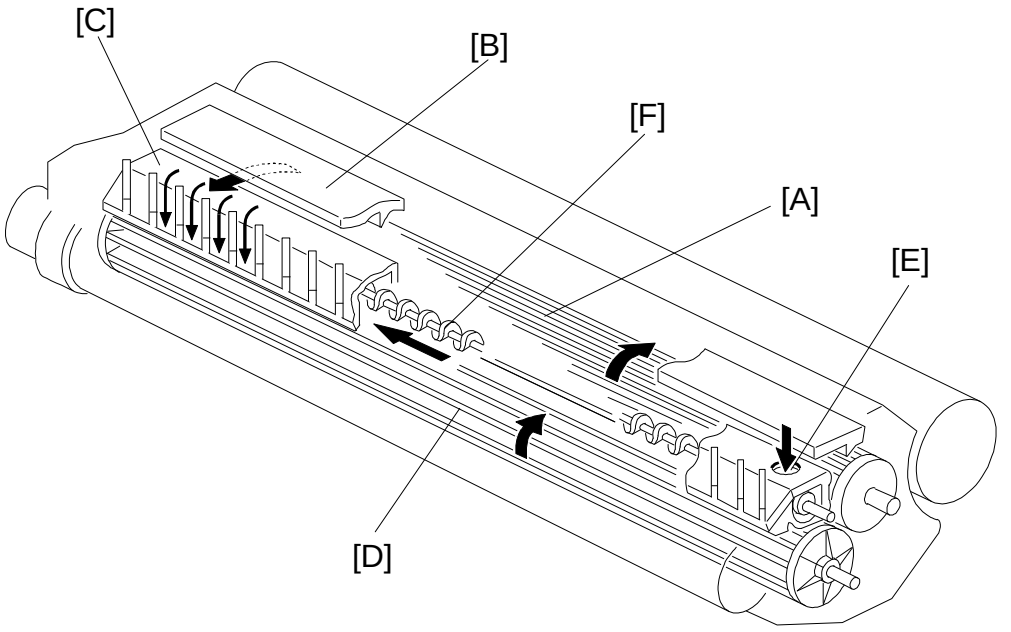
4.2 DRIVE MECHANISM



When the development motor [A] is on, the paddle roller [B], development roller [C], and mixing auger [D] in the development unit are driven through the development drive belt [E] and gears [F].

The toner agitator shaft [G] is rotated through the gears [H] by the toner supply clutch [I] engaged in the toner supply condition.

4.3 CROSS-MIXING



"Cross-mixing" keeps the developer's toner and carrier evenly mixed and evenly distributes the developer within the development unit. Cross-mixing also agitates the developer to generate the necessary triboelectric charge on the toner and carrier particles.

The arrows in the above illustration show the developer movement directions within the machine. The developer that is attracted to the development roller [A] is split into two parts by the doctor blade [B]. One part (the magnetic brush) goes on to develop the latent image on the drum. However, the other part is trimmed off by the doctor blade and directed to the backspill plate [C].

As the developer slides down the backspill plate to the paddle roller [D], part of the developer falls into the auger inlet [E] and is transported to the left side of the unit by the mixing auger [F], where it drops onto the paddle roller. The amount of developer moved to the right by the backspill plate is equal to the amount moved to the left by the mixing auger.

4.4 TONER DENSITY CONTROL

The toner supply amount ratio is determined by the following conditions.

	TS Level	0 ~ 50 sheets (~ 30 m)	51 ~ 100 sheets (30 ~ 60 m)	101 ~ 150 sheets (60 ~ 90 m)	151 ~ 200 sheets (90 ~ 120 m)	201 ~ 250 sheets (120 ~ 150 m)	251 sheets ~ (150 m ~)
N	0	$V_{TS} < 4.00$	$V_{TS} < 3.50$	$V_{TS} < 3.00$	$V_{TS} < 2.50$	$V_{TS} < 2.00$	$V_{TS} < 1.80$
	1	$4.00 \leq V_{TS} < 4.10$	$3.50 \leq V_{TS} < 3.80$	$3.00 \leq V_{TS} < 3.50$	$2.50 \leq V_{TS} < 3.00$	$2.00 \leq V_{TS} < 2.40$	$1.80 \leq V_{TS} < 2.00$
	2	$4.10 \leq V_{TS} < 4.20$	$3.80 \leq V_{TS} < 4.10$	$3.50 \leq V_{TS} < 4.00$	$3.00 \leq V_{TS} < 3.50$	$2.40 \leq V_{TS} < 2.80$	$2.00 \leq V_{TS} < 2.50$
	3	$4.20 \leq V_{TS} < 4.30$	$4.10 \leq V_{TS} < 4.20$	$4.00 \leq V_{TS} < 4.20$	$3.50 \leq V_{TS} < 4.00$	$2.80 \leq V_{TS} < 3.20$	$2.50 \leq V_{TS} < 3.00$
	4	$4.30 \leq V_{TS} < 4.40$	$4.20 \leq V_{TS} < 4.35$	$4.20 \leq V_{TS} < 4.30$	$4.00 \leq V_{TS} < 4.25$	$3.20 \leq V_{TS} < 3.60$	$3.00 \leq V_{TS} < 3.50$
	5	$4.40 \leq V_{TS}$	$4.35 \leq V_{TS}$	$4.30 \leq V_{TS}$	$4.25 \leq V_{TS}$	$3.60 \leq V_{TS}$	$3.50 \leq V_{TS}$
L	0	$V_{TS} < 4.25$	$V_{TS} < 4.00$	$V_{TS} < 3.50$	$V_{TS} < 3.00$	$V_{TS} < 2.50$	$V_{TS} < 2.00$
	1	$4.25 \leq V_{TS} < 4.30$	$4.00 \leq V_{TS} < 4.10$	$3.50 \leq V_{TS} < 3.80$	$3.00 \leq V_{TS} < 3.50$	$2.50 \leq V_{TS} < 3.00$	$2.00 \leq V_{TS} < 2.40$
	2	$4.30 \leq V_{TS} < 4.35$	$4.10 \leq V_{TS} < 4.20$	$3.80 \leq V_{TS} < 4.10$	$3.50 \leq V_{TS} < 4.00$	$3.00 \leq V_{TS} < 3.50$	$2.40 \leq V_{TS} < 2.80$
	3	$4.35 \leq V_{TS} < 4.40$	$4.20 \leq V_{TS} < 4.30$	$4.10 \leq V_{TS} < 4.20$	$4.00 \leq V_{TS} < 4.20$	$3.50 \leq V_{TS} < 4.00$	$2.80 \leq V_{TS} < 3.20$
	4	$4.40 \leq V_{TS} < 4.45$	$4.30 \leq V_{TS} < 4.40$	$4.20 \leq V_{TS} < 4.35$	$4.20 \leq V_{TS} < 4.30$	$4.00 \leq V_{TS} < 4.25$	$3.20 \leq V_{TS} < 3.60$
	5	$4.45 \leq V_{TS}$	$4.40 \leq V_{TS}$	$4.35 \leq V_{TS}$	$4.30 \leq V_{TS}$	$4.25 \leq V_{TS}$	$3.60 \leq V_{TS}$
H	0	$V_{TS} < 4.00$	$V_{TS} < 3.00$	$V_{TS} < 2.50$	$V_{TS} < 2.00$	$V_{TS} < 1.90$	$V_{TS} < 1.40$
	1	$4.00 \leq V_{TS} < 4.10$	$3.00 \leq V_{TS} < 3.50$	$2.50 \leq V_{TS} < 3.00$	$2.00 \leq V_{TS} < 2.40$	$1.70 \leq V_{TS} < 2.00$	$1.40 \leq V_{TS} < 1.70$
	2	$4.10 \leq V_{TS} < 4.20$	$3.50 \leq V_{TS} < 4.00$	$3.00 \leq V_{TS} < 3.50$	$2.40 \leq V_{TS} < 2.80$	$2.00 \leq V_{TS} < 2.50$	$1.70 \leq V_{TS} < 2.20$
	3	$4.20 \leq V_{TS} < 4.30$	$4.00 \leq V_{TS} < 4.20$	$3.50 \leq V_{TS} < 4.00$	$2.80 \leq V_{TS} < 3.20$	$2.50 \leq V_{TS} < 3.00$	$2.20 \leq V_{TS} < 2.70$
	4	$4.30 \leq V_{TS} < 4.40$	$4.20 \leq V_{TS} < 4.30$	$4.00 \leq V_{TS} < 4.25$	$3.20 \leq V_{TS} < 3.60$	$3.00 \leq V_{TS} < 3.50$	$2.70 \leq V_{TS} < 3.20$
	5	$4.40 \leq V_{TS}$	$4.30 \leq V_{TS}$	$4.25 \leq V_{TS}$	$3.60 \leq V_{TS}$	$3.50 \leq V_{TS}$	$3.20 \leq V_{TS}$

TS Level (Toner Supply Ratio)
0: No supply 1: 7.5% 2: 15% 3: 30% 4: 50% 5: 100%
N, L, H: SP#–9 setting

The toner density sensor is used for toner density control. It measures the ratio of toner to carrier in the developer.
Toner is supplied every 600 mm when the toner density sensor value (V_{TS}) meets one of the TS level conditions from 1 to 5. The triboelectric charge generated on the toner and carrier become greater in accordance with the copy quantity and is stabilized after 250 copies. To compensate the triboelectric charge characteristic, the value of the toner supply control changes as shown.

During the initial conditioning, the main motor rotates the development unit to stabilize the triboelectric charge generated on the toner and carrier and the toner density sensor is automatically adjusted to 4.0±0.1V using new developer. The initial conditioning (SP40) must be performed whenever the developer is replaced.

4.4.1 Toner Near End Condition

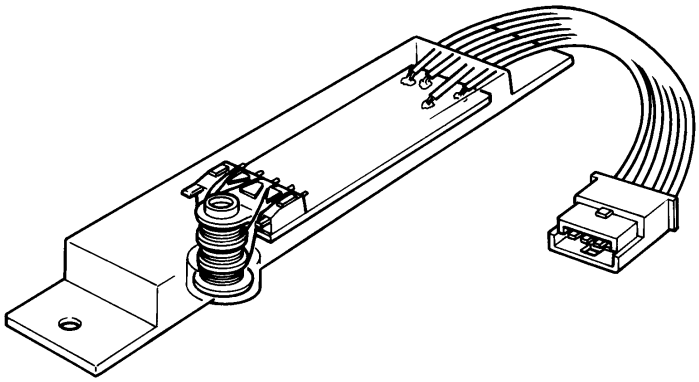
When TS level 5 is detected 3 times in a row, the toner near end condition is detected and the add toner indicator starts flashing. When in the toner near end condition, 16 more meters (A1/D size: 27 copies) can be copied. Then the add toner indicator will light and the machine will not operate.

4.4.2 Recovery From Toner End Condition

After replacing the toner cartridge (opening and closing the original feed unit), the development motor rotates the development unit for 30 seconds. During this period, toner is supplied at 100% of the supply amount until TS level reaches 3. Then, copies can be made.

If TS level does not reach less than 3, the CPU stops the machine and displays the toner end condition. This prevents the operators from resetting the toner end condition by simply opening and closing original feed unit.

4.4.3 Toner Density Sensor



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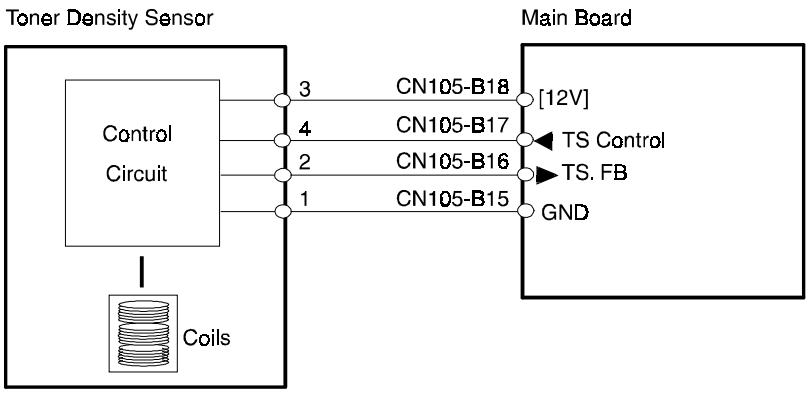

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The toner density sensor circuit controls the amount of toner in the developer mixture.

The toner density sensor is powered by 12 volts from CN105-B18 of the main board. (The potential of CN105-B18 is 24 V when the connector is disconnected.) The sensor's sensitivity is set by the feedback signal applied from CN105-B16. The input signal from the sensor passes to the main board at CN105-B17. This is an analog signal.

The active sensor element is a very small transformer with three coils. When iron ferrite (carrier) is near the sensor element, the inductance of the coils changes, causing the current through the transformer to change. As the amount of toner in the developer increases, the effect of the carrier particles decreases and the voltage applied to CN105-B16 decreases. Conversely, when the toner concentration drops as toner is used up, the effect of the carrier on the sensor coils increases and the voltage at CN105-B16 also increases.

4.5 DEVELOPMENT BIAS

4.5.1 Basic Concept

When the drum is exposed, most of the negative charge is eliminated from the areas where light strikes the drum. This leaves a negative charge pattern corresponding to the dark areas of the original. After exposure, however, a small residual charge of about –100 volts (for white paper) remains in the exposed areas. This residual charge could attract positively charged toner from the development roller, resulting in dirty background on the copy.

The development bias prevents this cause dirty background. A negative bias that is a little larger than the residual charge is applied to the development roller. This prevents the positively charged toner from being attracted to the background areas of the latent image.

4.5.2 Manual Image Density Bias

The development bias is applied as shown by the above chart.

In addition to the development bias, the image density is also controlled by varying the exposure light intensity. (See the exposure section.)

Manual ID Level	Bias (Volts)	Manual ID Level	Bias (Volts)
1	–60	14	–180
2	–80	15	–180
3	–110	16	–200
4	–120	17	–200
5	–130	18	–200
6	–150	19	–200
7	–180	20	–240
8	–180	21	–240
9	–180	22	–280
10	–180	23	–280
11	–180	24	–280
12	–180	25	–280
13	–180	26	–280

4.5.3 Auto Image Density Bias

The ADS can be switched to the "Darker"setting with service program mode #18 or "Lighter" setting.

In addition to the development bias, the image density is also controlled by varying the exposure light intensity. (See the exposure section.)

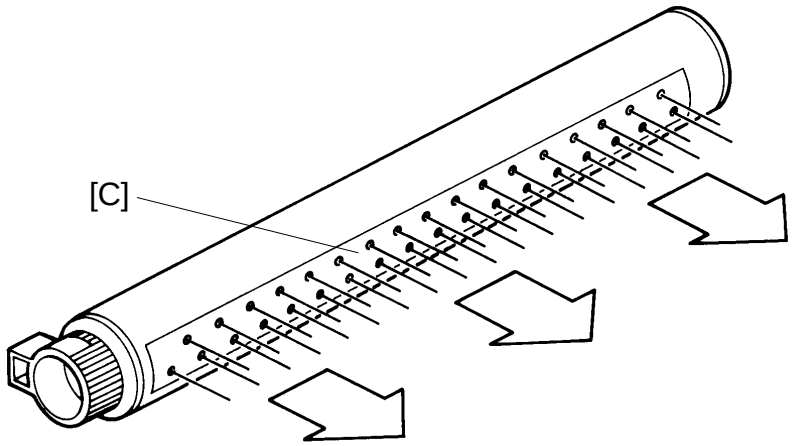
Vod/Vsd	Bias [V]	Vod/Vsd	Bias [V]
0~0.45	–280	0.64~0.65	–200
0.46~0.47	–280	0.66~0.67	–180
0.48~0.49	–280	0.68~0.69	–180
0.50~0.51	–280	0.70~0.71	–180
0.52~ 0.53	–280	0.72~0.73	–180
0.54~0.55	–240	0.74~0.75	–180
0.56~0.57	–240	0.76~0.80	–180
0.58~0.59	–200	0.81~0.84	–180
0.60~0.61	–200	0.85~0.88	–180
0.62~0.63	–200	0.89~	–180

Vod: Original Density Detecting Voltage
Vsd: Standard Pattern (White Plate) Density Detecting Voltage

4.5.4 Bias Adjustment

Using service program mode #–25, the bias level can be increased or decreased.

4.6 TONER SUPPLY



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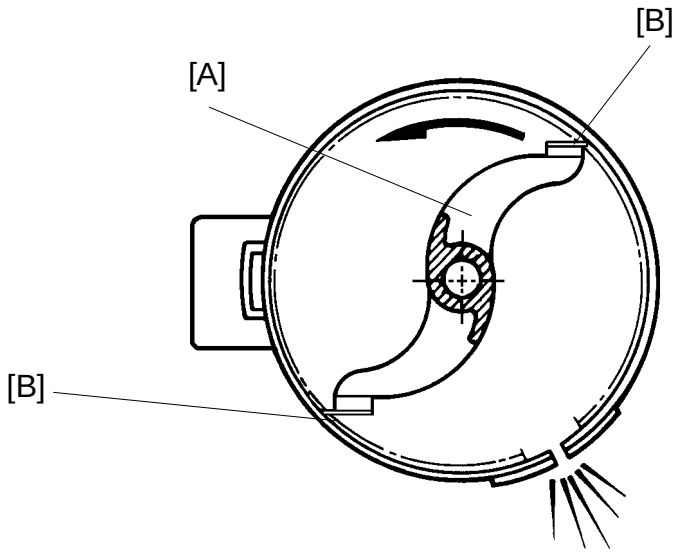

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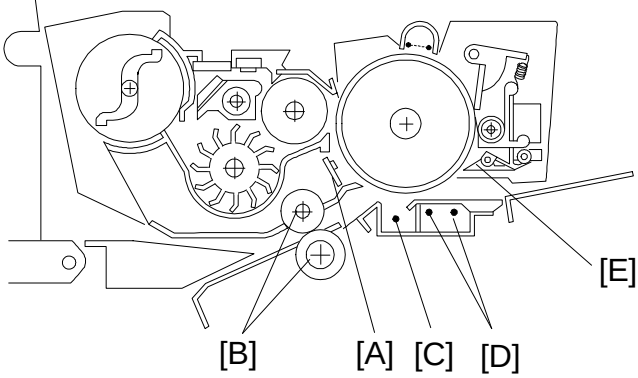
To allow a compact design, the toner supply mechanism is built into the toner cartridge. An agitator [A] in the toner cartridge turns when the toner supply clutch is engaged. As the agitator rotates, mylar strips [B] on the ends of the agitator force toner through small holes (0.5 mm in diameter) in a plastic strip [C] along one side of the toner cartridge. The toner particles thus ejected from the cartridge fall into the development unit and are mixed into the developer. The toner agitator turns at 75 rpm and the toner supply rate is approximately 22.5 grams per minute.

5. IMAGE TRANSFER AND PAPER SEPARATION



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5.1 PRE-TRANSFER LAMP (PTL)

After the latent image is developed but before the image is transferred to the copy paper, the drum surface is illuminated by the pre-transfer lamp [A]. This illumination reduces the negative potential on the drum surface. This prevents toner particles from being re-attracted to the negatively charged drum during the paper separation process. It also makes image transfer and paper separation easier.

5.2 IMAGE TRANSFER

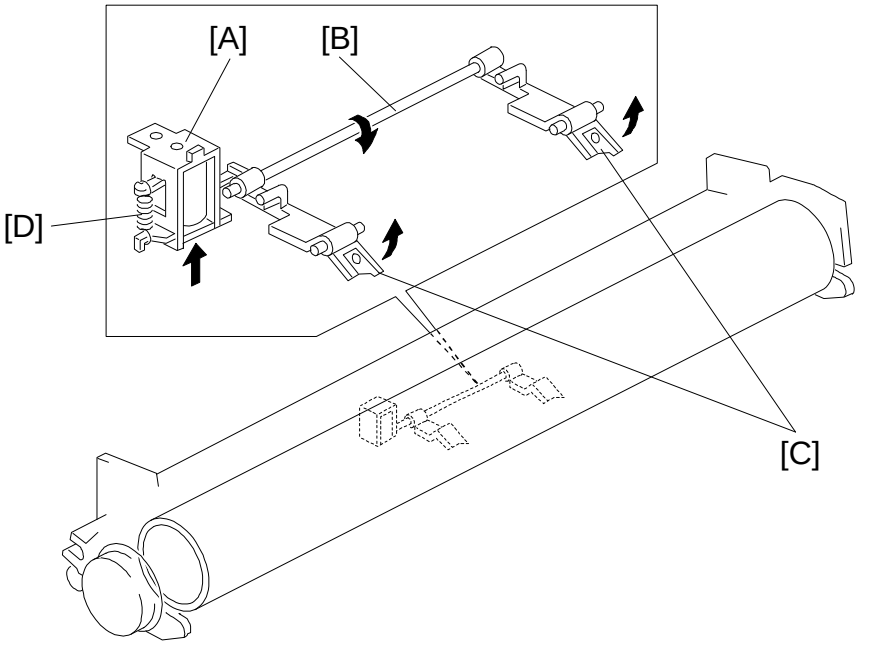
The registration rollers [B] feed the copy paper through the transfer entrance guides to the transfer section. A high negative voltage (about –5.0 kV) is applied to the transfer corona wire [C], and the corona wire generates negative ions. These negative ions are applied to the copy paper, and the negative charge attracts the positively charged toner away from the drum and onto the paper. In addition, the paper is held against the drum by the positive counter charge on the drum.

5.3 PAPER SEPARATION

After image transfer, the copy must be separated from the drum. To break the attraction between the paper and the drum, the separation corona wires [D] apply an ac corona (5.0 kV) to the reverse side of the paper. The stiffness and weight of the paper cause it to separate from the drum.

The separation corona has a negative component. This negative component holds the toner on the paper to prevent it from being reattracted to the drum during paper separation. The two pick-off pawls [E] ensure that thin paper, paper with low stiffness, or upward curled paper separates completely from the drum.

5.4 PICK-OFF MECHANISM



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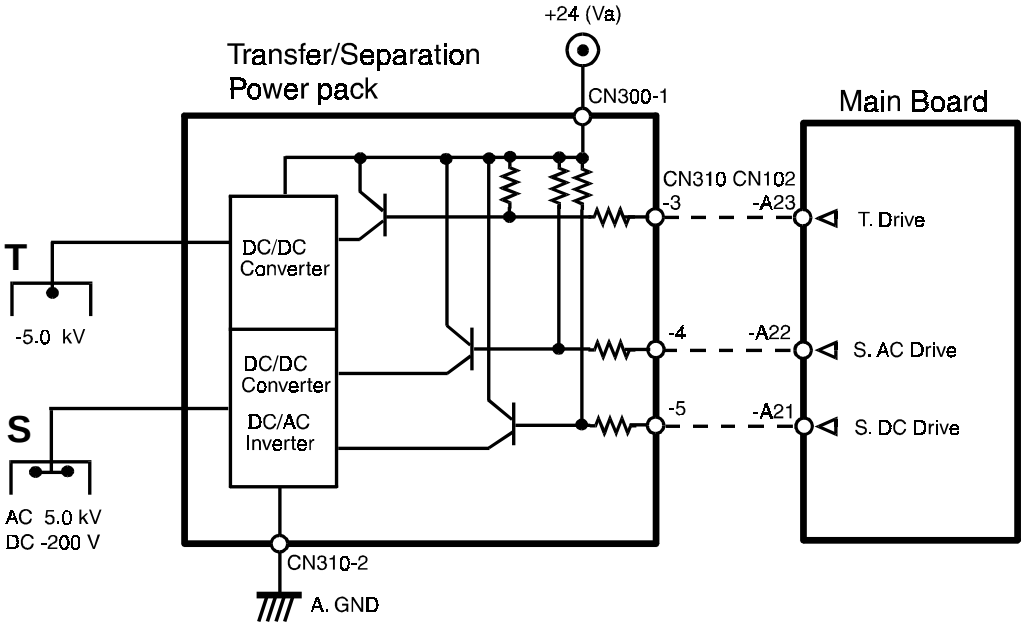
The pick-off pawl solenoid [A] is energized after the registration clutch turns on to feed the copy paper to the drum. The pick-off shaft [B] then rotates clockwise and the pick-off pawls [C] touch the drum surface.

Just after the leading edge of the copy paper passes the pick-off pawls, the pick-off solenoid turns off again. The pick-off spring [D] then rotates the pick-off shaft counterclockwise and moves the pick-off pawls away from the drum.

5.5 T/S CORONA CIRCUIT



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The T/S power pack is powered by +24 volts (Va) from the Main Board. The dc/dc converters and dc/ac inverter change the +24 volts supply into the high voltages used by the transfer and separation coronas.

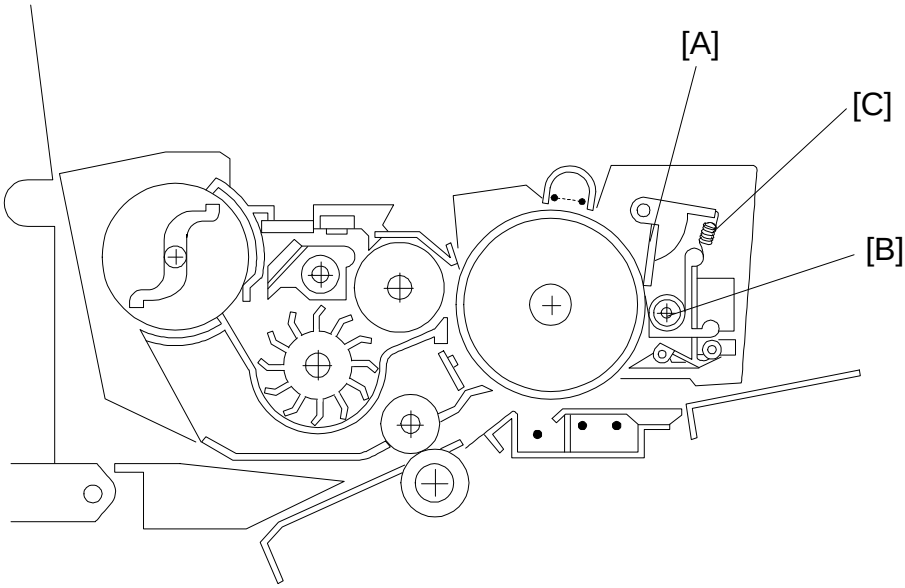
The main board turns on the transfer corona using PWM signal (T.Drive). This turns on the dc/dc converter, which applies a high voltage of approximately –5.0 kV to the transfer corona wire. The main board turns on the separation corona using PWM signals (S.AC Drive and S.DC Drive). The dc/dc converter and dc/ac inverter circuits then apply approximately 5.0 kV ac and –200 V dc to the separation corona wires.

A larger transfer current is applied when the fusing unit is in high or low temperature mode than in normal temperature mode. In high or low mode, thin copying paper (translucent paper or film) may be wrapped around the drum. This may cause the paper to be jammed or transported incorrectly. To correct for this, the separation current is increased in high and low modes. To ensure good copy quality in high mode, the PTL (pre-transfer lamp) is off during the copy process.

A larger separation current is applied at the leading edge of the paper to improve the separation in high temperature mode.

6. CLEANING

6.1 OVERVIEW



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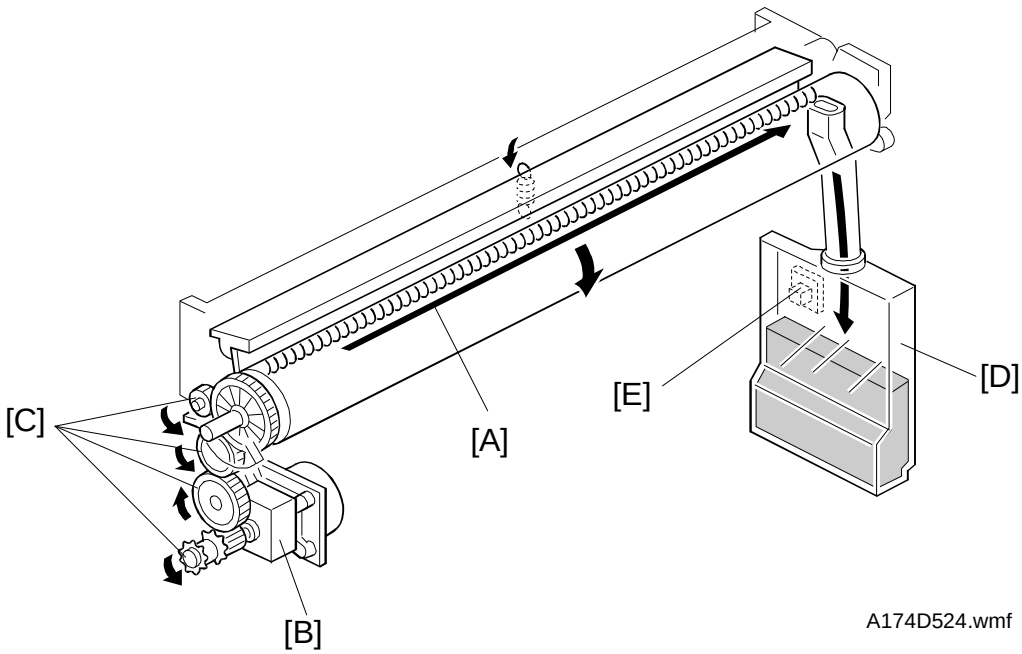
This copier uses the counter blade system for drum cleaning. The blade [A] is angled against the drum rotation. This counter blade system has the advantage of high cleaning efficiency.

The cleaning blade removes any toner remaining on the drum after the image is transferred to the copy paper. The toner that is wiped off by the cleaning blade drops onto the toner collection coil [B], which then moves it to the toner collection bottle.

The cleaning blade pressure spring [C] applies pressure to the exact center of the cleaning blade so that pressure is evenly applied across the entire length of the cleaning blade. Blade pressure is applied constantly.

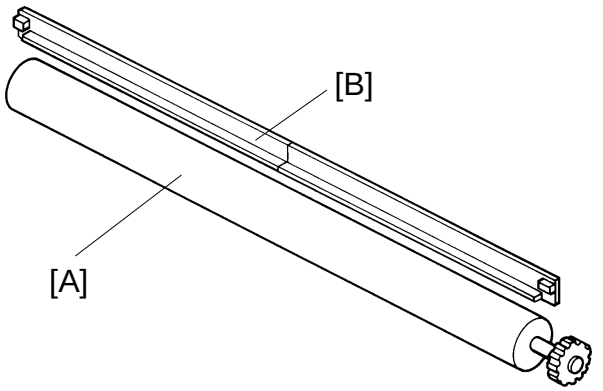
6.2 COLLECTION OF USED TONER



The toner collection coil [A], which is rotated by the main motor [B] through the gears [C], moves used toner from the cleaning unit to the toner collection bottle [D]. The toner collection bottle capacity is enough to hold used toner from making 6 km (10K/A1, capacity: 4000 ml) copies.

The toner overflow sensor [E] detects when the used toner tank is full. The toner overflow indicator starts flashing in the operation panel.
While the toner over indicator is flashing, 20 more meters (A1/D size: 34 copies, SP No. 67 setting) can be copied. Then the toner overflow indicator will light and the machine will not operate.

7. QUENCHING



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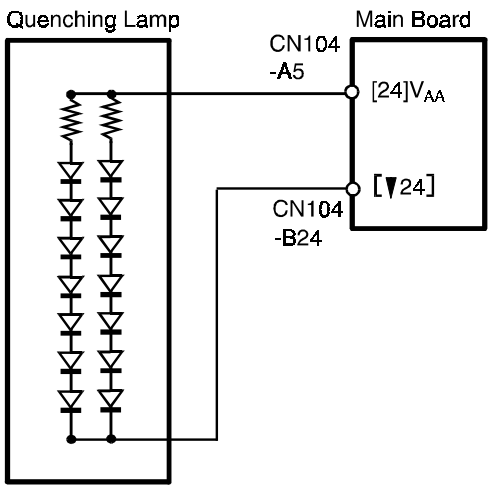

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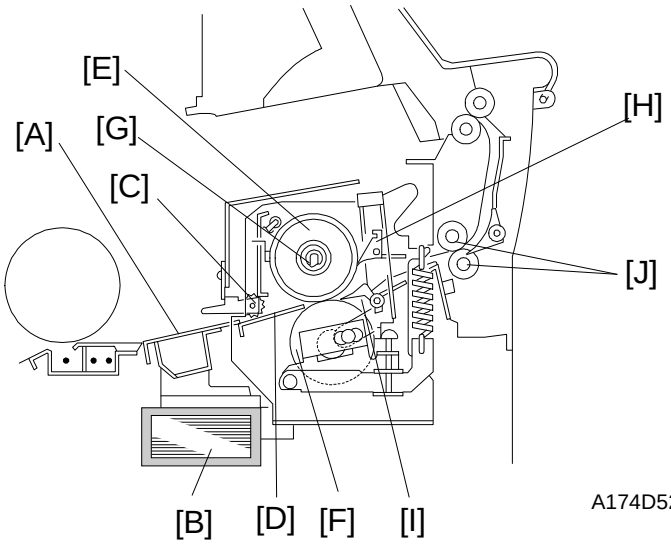
After the drum [A] is cleaned by the cleaning blade, light from the quenching lamp [B] neutralizes any charge remaining on the drum. The quenching lamp turns on and off at the same time as the main motor.

The main board turns on the quenching lamp LEDs by dropping CN104-B24 to 0 volt.

8. FUSING AND PAPER EXIT

8.1 OVERVIEW



After separation from the drum, copy paper rides on the transport belt [A]. Air flow directly from the vacuum fan [B] against the belts so that there is enough friction between the paper and belt for the smooth transportation.
The small separation rollers [C] hold the paper against the transport plate [D] so that the back curled paper is straightened before it enters the fusing section.

Two rollers fuse the image to the copy paper by applying heat and pressure. The hot roller [E] is made of carbon-teflon and the pressure roller [F] is made of silicone rubber. Pressure is constantly applied by the pressure levers at the ends of the fusing unit.

The fusing lamp [G], which is located at the hot roller axis, turns on and off to maintain the operating temperature. The temperature control circuit on the main board monitors the surface temperature of the hot roller and the pressure roller through a thermistor.

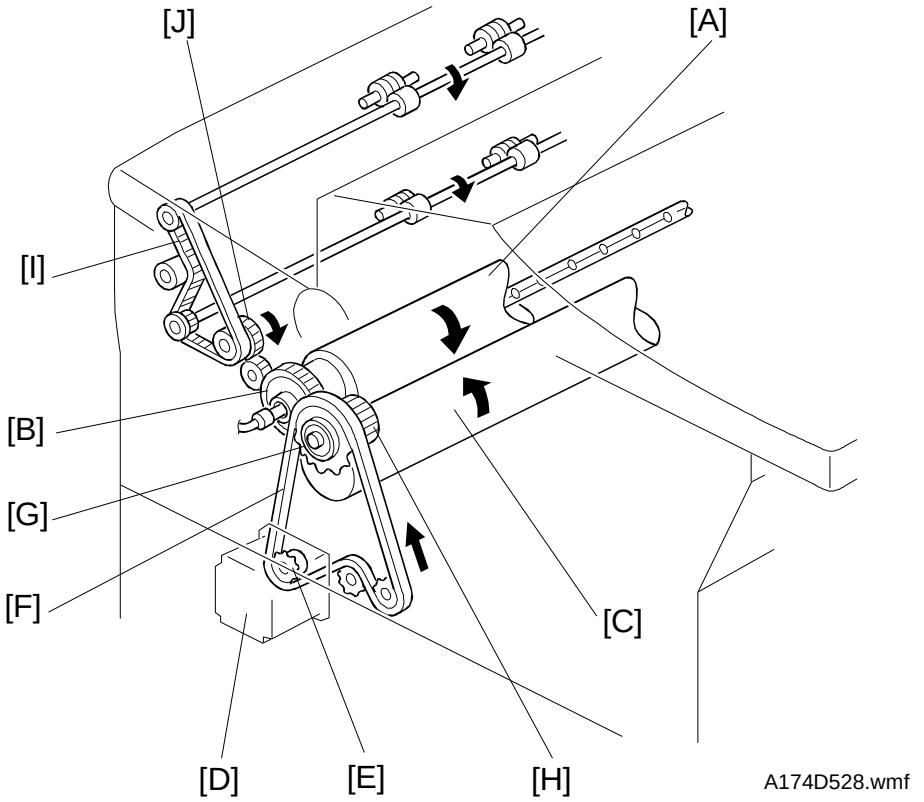
There are three operating temperature settings: normal, high, and low. The normal setting has a choice of 12 temperature settings, adjustable by SP1 or key operation. The high setting has a choice of 3 temperature settings. The low setting also has a choice of 2 temperature settings.

The hot roller strippers [H] pressure roller strippers [I] separate the copy from the hot roller and direct it to the fusing exit rollers [J].

The thermofuse provides backup overheat protection. (See the section on fusing temperature control.)

8.2 DRIVE MECHANISM

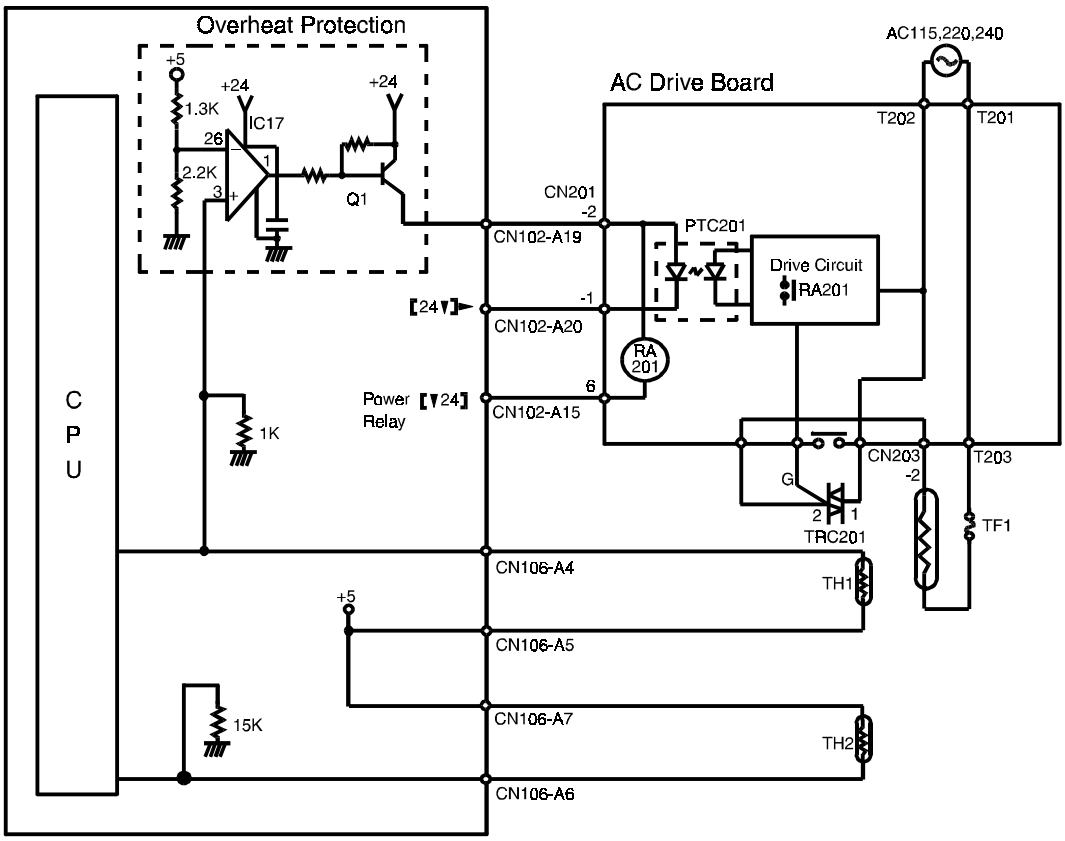
8.2.1 Fusing Unit Drive



The hot roller [A] is turned by the hot roller drive gear [B] as shown. The pressure roller [C] is friction driven by the hot roller. The fusing rollers turn constantly when the fusing drive motor [D] is on, driven via the gear [E], through the fusing drive chain [F], sprocket [G], and gear [H], to the hot roller drive gear.

The exit section is driven by the exit unit drive belt [I] through the hot roller drive gear and gears [J].

8.3 FUSING TEMPERATURE CONTROL



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8.3.1 Fusing Circuit Operation

The fusing lamp is powered by the ac drive board and controlled by the main board.

The ac drive board receives direct wall voltage ac power (not stepped down) at T201 and T202. It also receives +24 volts at CN201-2. The ac power is applied to the drive circuit, the fusing lamp, and the triac (TRC201). The dc power drives PTC201 and RA201.

To turn on the fusing lamp, the main board drops CN102-A20 to LOW. This activates the photocoupler (PTC201) which in turn energizes the drive circuit. The drive circuit turns on the triac to complete the lamp circuit, thus turning on the lamp.

RA201 guards against a failure of the +24 volt power supply. When +24 volts is applied at CN201-2 and CN102-A15 drops to LOW, RA201 is energized and its ac contacts stay open. If the +24 volts power from CN102-A20 stops, the ac contacts of RA201 close, stopping the drive circuit and turning off the fusing lamp.

8.3.2 Overheat Protection

The overheat protection circuit on the main board turns off the fusing lamp if the temperature goes too high.

The input from TH1 (Hot Roller Thermistor) goes to pin 3 of IC17 as well as to the CPU. As the temperature of TH1 increases, its resistance decreases and therefore the voltage at pin 3 of IC17 increases. If this voltage becomes greater than the voltage at pin 2, the output at pin 1 becomes HIGH. Q1 then turns off and cuts the +24 volt supply to ac drive board. The fusing lamp then turns off. The overheat protection circuit becomes effective at about 215°C.

TF1 provides overheat protection in case a short bypasses the control and drive circuits. This fuse will open if it reaches approximately 192°C.

8.4 TEMPERATURE CONTROL

8.4.1 Normal

Hot Roller Temperature Control (Normal)

Pressure Roller Temp.	70	80	90	100	110	120	130	140	150	160	170
Mode 1	195 193 191 189 187 185 183 181 179 177 175 173 171 169 167 165 163							161			
Mode 2	195	190	185	180	175	170	165		160		
Mode 3	195	193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163		161		
Mode 4	195	190	185	180	175	170	165		160		
Mode 5	195	193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163		161		
Mode 6	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163	161		
Mode 7	195		190	185	180	175	170		165		
Mode 8	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163	161 159	157	
Mode 9	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163	161 159	157	155
Mode 10	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163	161 159	157	155
Mode 11	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163			161
Mode 12	195		193 191 189 187	185 183 181 179	177 175	173 171	169 167	165 163			161

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8.4.2 High

Mode No.	Paper Width (mm)	Pressure Roller Temperature							Copy Disable Condition		*
		150	155	160	165	170	175	180	Hot Roller Temperature	Pressure Roller Temperature	
1	841 or wider or by-pass feed	195							185~	105°C or lower	115~130°C
									180~185	110°C or lower	
									175~180	120°C or lower	
									~175	Copy unconditionally disable	
	594	195	190	185	180	175	165		185~	105°C or lower	115~130°C
									180~185	110°C or lower	
									175~180	120°C or lower	
									170~175	160°C or lower	
									160~170	165°C or lower	
									~160	Copy unconditionally disable	
	420 or nar-rower	195				190	185		185~	105°C or lower	115~130°C
									180~185	110°C or lower	
									175~180	120°C or lower	
									~175	Copy unconditionally disable	
2	All size	205							200~	125°C or lower	145~160°C
									195~200	130°C or lower	
									190~195	135°C or lower	
									185~190	140°C or lower	
									~185	Copy unconditionally disable	
3	All size	210							201~	140°C or lower	150~165°C
									200~205	145°C or lower	
									195~200	155°C or lower	
									~195	Copy unconditionally disable	

8.4.3 Low

Mode.	Hot Roller Temperature (°C)	Copy Disable Condition	*
1	170	When the hot roller temperature goes down to 155°C or lower.	115 ~ 130°C
2	180		

* The maintained pressure roller temperature when the fusing unit idling in copy stand-by condition.

The main board monitors the temperature of the hot roller through TH1 and the temperature of the pressure roller through TH2. The CPU determines whether or not to turn on the fusing lamp based on the combination of the input from these two thermistors. If the pressure roller is cool, the CPU keeps the hot roller temperature high. However, if the pressure roller is hot, the CPU decreases the operating temperature of the hot roller. The above chart shows the relationship between the temperatures of the hot and pressure rollers.

The operating temperature of the hot roller and pressure roller can be adjusted using SP#–6 and SP#–7. These programs are used to compensate for variations in the response of different thermistors. SP#–6 adjusts the hot roller temperature and SP#–7 adjusts the pressure roller temperature. SP#–6 and #–7 shift the temperature in 1 degree increments (–9°C to +9°C). The fusing temperature can be monitored using SP#–8.

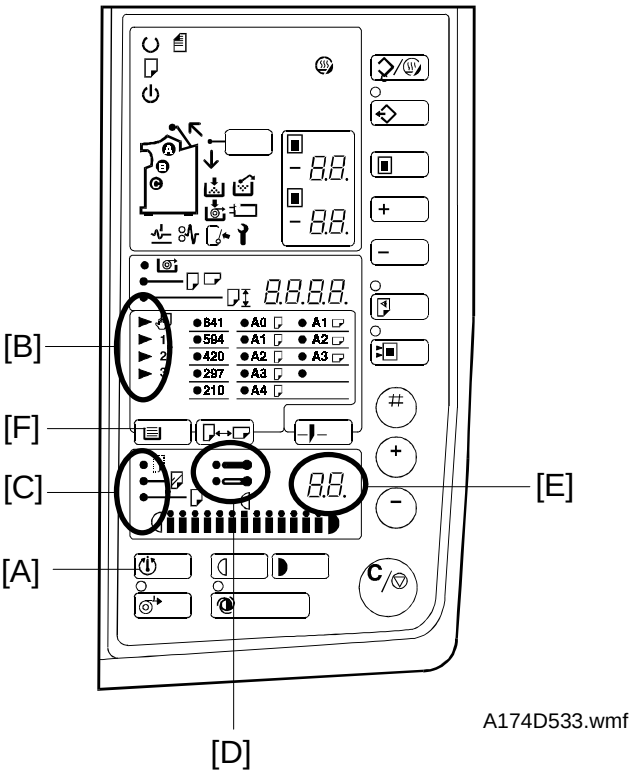
- The ready condition -

When the hot roller temperature reaches the ready temperature, the copier enters the ready condition, and copying is possible. The ready temperature is anywhere that is 5° lower than the hot roller operating temperature in the selected fusing unit mode.

- Fusing Unit Operating Modes -

There are three operating temperature modes, selected with the fusing temperature key: normal (for use with plain paper), high (for translucent paper), and low (for translucent film).

The normal temperature mode can have one of 12 temperature settings (modes 1 to 12; see the diagram on the previous page); the setting is selected by key operation. The high temperature mode can have one of 3 temperature settings (mode 1 to 3); the setting is selected by key operation. The low temperature mode can also have one of 2 temperature settings (mode 1 and 2); the setting is selected by key operation. In this way, the setting of the fusing unit temperature modes can be adjusted to match the paper type more exactly, either by a service technician, or by a key operator.



– Key operation to change the temperature setting–

First, hold the fusing temperature key [A] down for longer than 3 seconds,

a) The roll feed station (1st, 2nd, or 3rd) indicator [B], which is selected, blinks.

b) The selected paper media (translucent paper, film or plain paper) [C] and selected temperature mode[D] are light.

c) The selected number in the copy quantity indicator [E] blink.
Select the roll feed station using paper select key [F] and select the paper media using fusing temperature key.

Select required setting with "+" and "-" keys, then press the "#"key to store the setting (normal: 1 to 12, high: 1 to 3, low: 1 to 2).

NOTE: The setting input by this procedure does not overwrite the settings that are stored in SP mode when "0" or "2" is selected in SP#60 (Auto fusing temperature change). In this case, the setting input by this procedure is kept in memory for fusing temperature control. The settings that are stored in SP#1, 2 and 3 are ignored.
If "1" is selected in SP#60, the setting input by this procedure overwrites the settings that are stored in SP#1, 2, and 3. In this case, the settings of SP#1, 2, and 3 are used for fusing temperature control.

– High temperature mode –
The fusing rollers rotate in copy stand-by condition to keep the pressure roller temperature as shown in the diagram. During copy job, the machine keep the relationship between the hot and pressure roller as shown in the diagram. During copy job, the hot roller and pressure roller temperatures may come into the copy disable conditions. The copier stops and fusing lamp turns on until the temperatures return to the range of high mode. The original will automatically feed out. This is default setting of SP#61. By changing SP#61 (Fusing temperature recovery setting) setting, other 3 selections can be chosen.

– Low temperature mode –
The hot roller temperature may come into the copy disable conditions during copy job. The copier stops and fusing lamp turns on until the temperature returns to the range of low mode. The situation is the same as high temperature mode.

After fusing, paper shrinks slightly, and expands again after a few minutes. The shrinkage and expansion are different at different fusing unit temperatures. Therefore, if the fusing unit operating mode settings have been changed, cutting length adjustment of the roll feeder unit may be required.

8.5 ENERGY SAVER FUNCTION

When the copier is not in use, the energy saver function reduces the power consumption by decreasing the fusing temperature.

When the Clear Modes/Stand-by key is hold down for over 2 seconds, the copier goes into the energy saver mode. A message is displayed on copy counter and all the other indicators turn off.

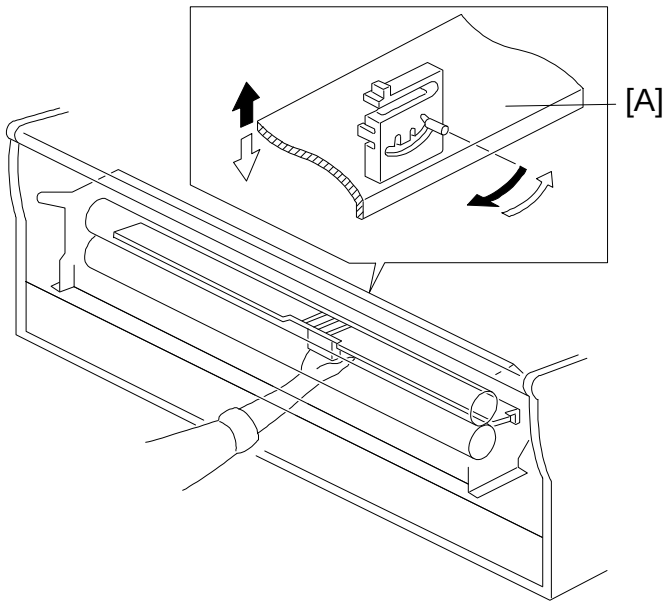
The fusing temperature is decreased by 15°C from one of the normal mode settings for copying. The energy saving ratio is approximately 14%. The waiting time until the copier returns to the ready condition is approximately 60 seconds.

NOTE: The above energy saving ratio is a standard value measured in laboratory tests under controlled conditions. The actual ratio will vary depending on environmental conditions, copy modes, power supply conditions and measurement instruments.

Press the Clear Mode/Standby key. The copier is returned to the ready condition after a warm-up time.

When the auto energy saver mode (SP#11) is selected, the copier automatically goes to the energy saver mode at the auto reset time selected by SP#10.

8.6 FUSING ENTRANCE GUIDE HEIGHT



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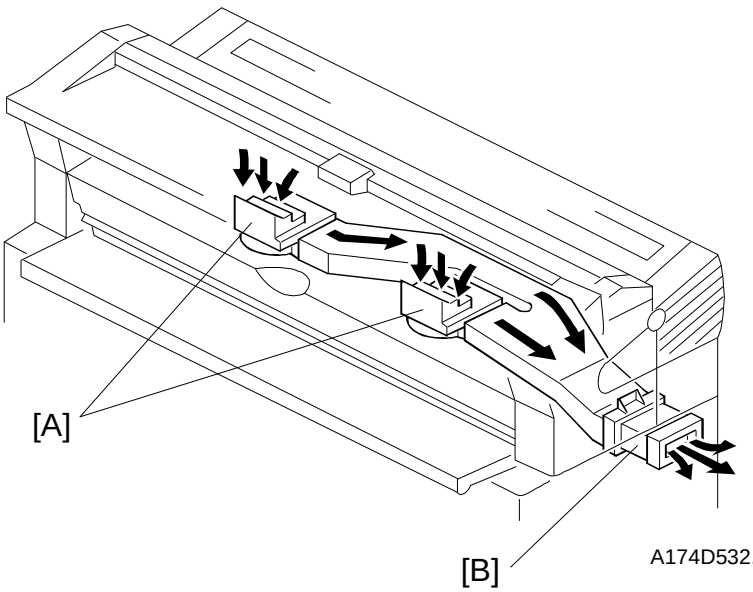
Paper creasing may occur depending on the type of paper used. The fusing entrance guide [A] height is changed by adjusting a lever (there are three settings).

8.7 TRANSPORT UNIT VENTILATION

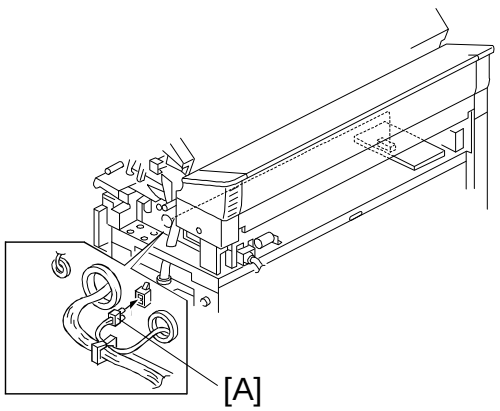


To hold the copy paper firmly against the transport belts, two vacuum fans [A] underneath the transport belt unit suck air.

As the vacuumed air includes ozone, the air is changed to oxygen by the ozone filter [B] before blown out of the copier.

9. ENERGY STAR COMPLIANT MACHINES (North American version only)

In conjunction with the modification for the Energy Star compliance, field technicians are requensted to understand the changes in operation modes so as to configure the machine for the customer specific environment/requirements. This bulletin refers to all diferences between the Energy Star compliant machines and the other machines produced previously.

Mode	Non-Energy Star	Energy Star
Auto Off Mode	Not available	The copier turns off after the selected time after the last copying job. The time can be adjusted from 1 to 120 minutes. This mode cannot be canceled. Default: 30 minutes
SP Mode	Not available	Mode No.: 19 Function: Auto off time can be selected Settings: 1~120 minute (1 minute per step) Default: 30 minutes The auto off time can also be selected by the customer. The Auto off mode is prohibited in the following conditions. • The roll feeder is operating. • A sheet of paper is set on the feed table. • A Jam or SC indicator in on. • Toner end indicator is on or Used Toner bottle is full.
Anti-condensation heaters	All plugged in	The drum anti-condensation heater [A] is unplugged.  A174I527.wmf

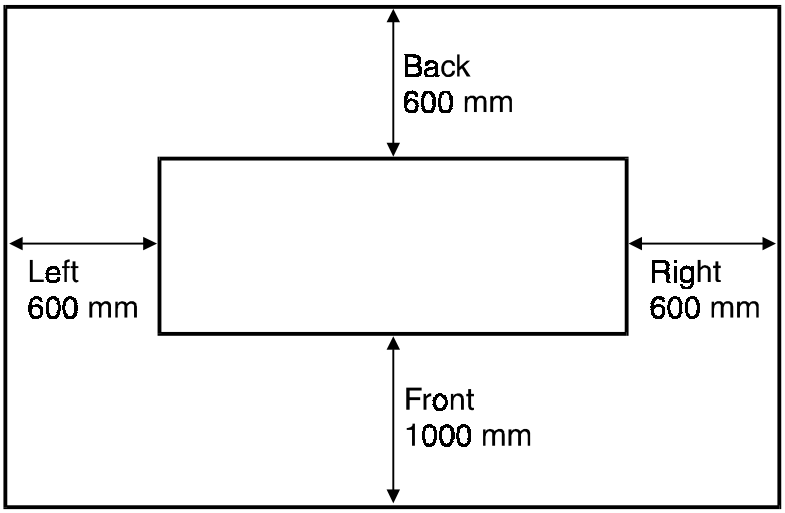
SECTION 3

INSTALLATION

1. ENVIRONMENT

1. Temperature Range: 15°C to 30°C (59°F to 86°F)
2. Humidity Range: 20% to 80% RH
3. Ambient Illumination: Less than 1,500 Lux (do not expose to direct sunlight).
4. Ventilation: Minimum space 20 m^3
   Room air should turn over at least 30 m^3/hr/person.
5. Ambient Dust: Less than 0.15 mg/m^3
   (4×10^{-3} oz/yd^3)
6. If the installation place is air-conditioned or heated, place the machine as follows:
   a) Where it will not be subjected to sudden temperature changes from low to high, or vice versa.
   b) Where it will not be directly exposed to cool air from an air conditioner in the summer.
   c) Where it will be directly exposed to reflected heat from a space heater in the winter.
7. Avoid placing the machine in an area filled with corrosive gases.
8. Avoid any area higher than 2,000 m (6,500 ft) above sea level.
9. Place the machine on a strong and level base.
10. Avoid any area where the machine may be subjected to frequent strong vibration.

1.1 MINIMUM SPACE REQUIREMENTS



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1. Front: 1,000 mm (39 in)
2. Back: 600 mm (24 in)
3. Right: 600 mm (24 in)
4. Left: 600 mm (24 in)

1.2 MACHINE LEVEL

1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

Make sure that the machine is level using a carpenter’s level.

1.3 POWER SOURCE

1. Input Voltage Level: 115 V/60 Hz
   More than 12 A (for U.S.A. version)

   220 V/230 V/240 V/50 Hz
   More than 7 A (for European version)

2. Permissible Voltage Fluctuation: ±10%

3. Do not set anything on the power cord.

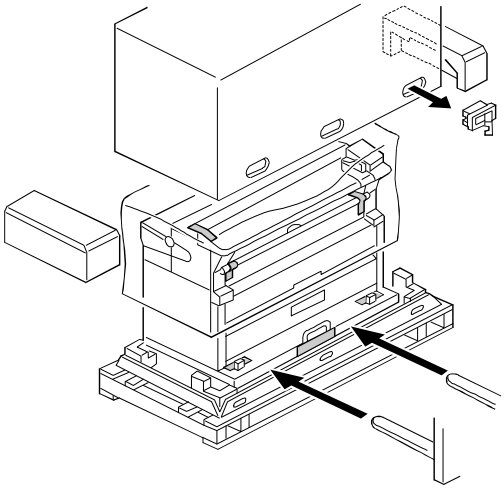
   NOTE: a) Make sure the plug is firmly inserted in the outlet.
   b) Avoid multi-wiring.

2. COPIER INSTALLATION PROCEDURE (A174)

2.1 ACCESSORY CHECK

Check the accessories and their quantities against the following list:

Description	Q'ty
1. Paper Spool	2
2. Copy Tray	1
3. Guide Wire	2
4.Copy Guide	1
5. End Guide Stocker Holder	2
6. Middle Guide Stocker Holder	1
7. Guide Stocker	3
8. Original Tray 1	2
9. Original Tray 2	2
10. Original Guide	2
11. Total Counter Cover	1
12. Right Inner Cover	1
13. Screw With Spring Washer - M4 x 10	2
14. Screw - M4 x 6	8
15. Tapping Screw - M4 x 8	1
16. Pin Screw	4
17. Nylon Clamp-11N	2



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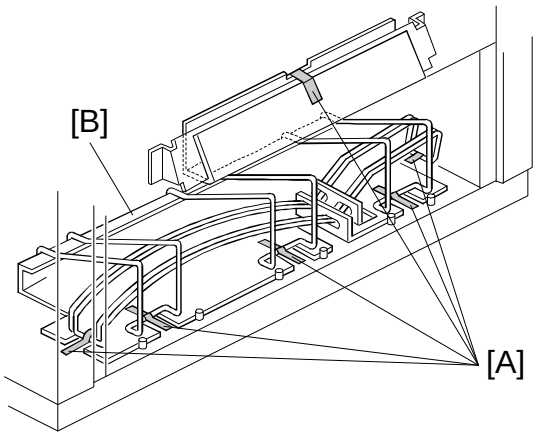

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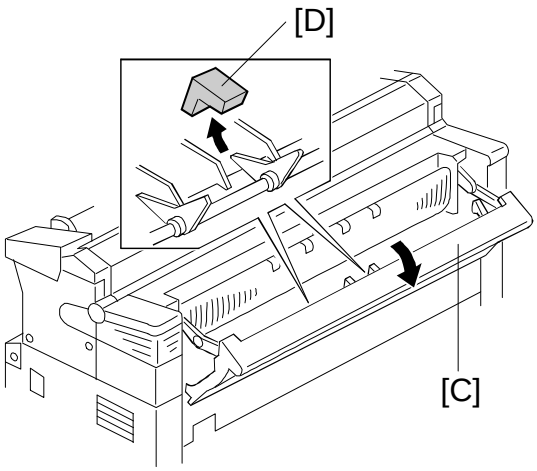

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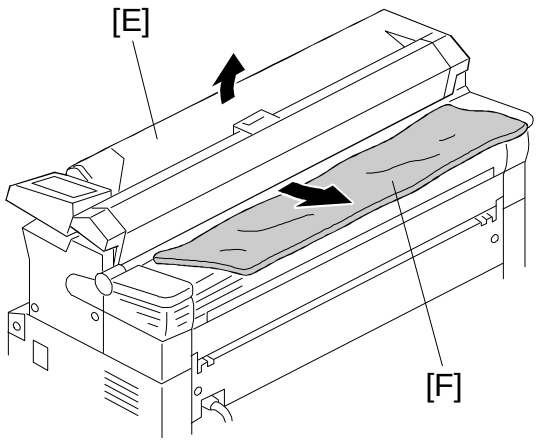

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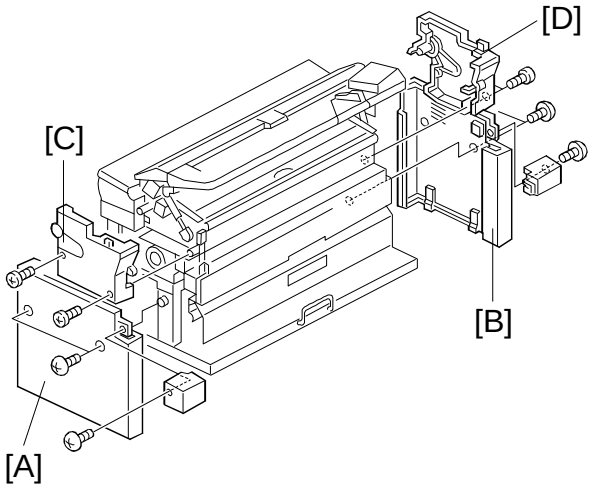
1. Unpack the machine carton box and place the copier onto a flat floor using such a fork lift.
2. Remove the strips of filament tape [A] and cardboard [B].
3. Open the fusing exit cover [C] and remove the shipping blocks [D].
4. Open the original feed unit [E] and remove the cushion [F].



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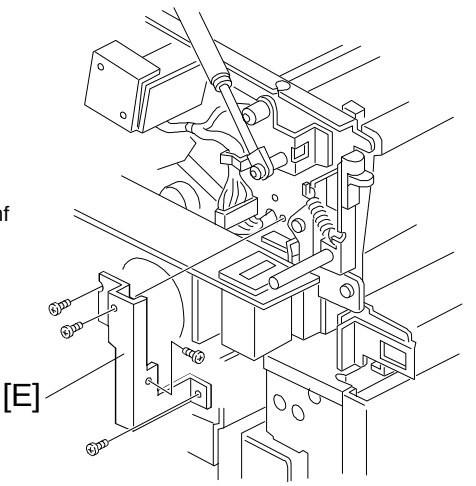

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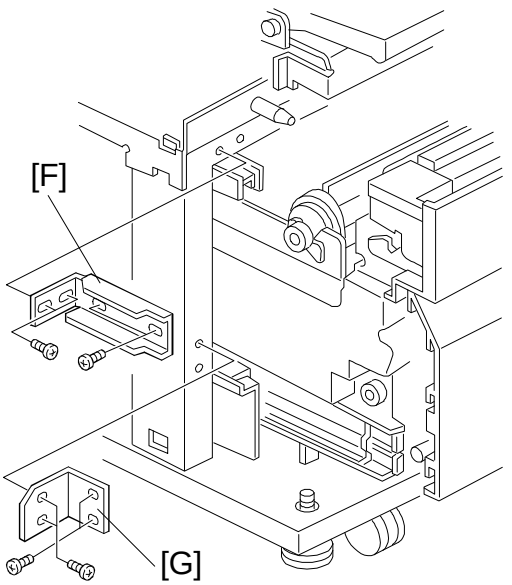

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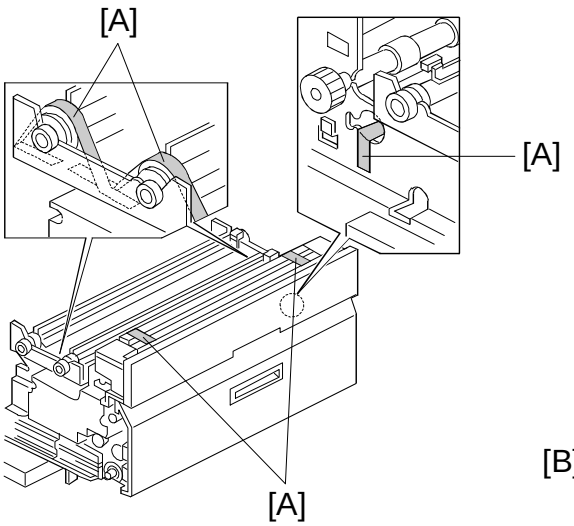
5. Remove the left and right lower covers [A, B] (3 screws each) and the left and right upper front covers [C, D] (2 screws each).

6. Remove the shipping retainers [E] (4 screws each) from the right and left sides.

   NOTE: The upper shipping retainers [F] are required when removing the image producing unit. Keep them for future use (refer to 5-42).

7. Remove the upper shipping retainers [F] and pull out the 1st and 2nd roll feed unit (4 screws each) and lower shipping retainers [G] (4 screws each) from the right and left sides.



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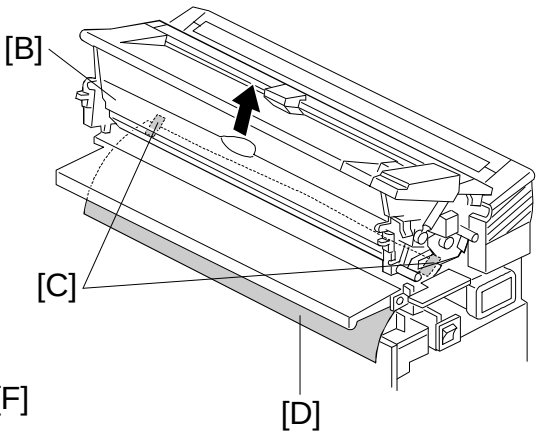

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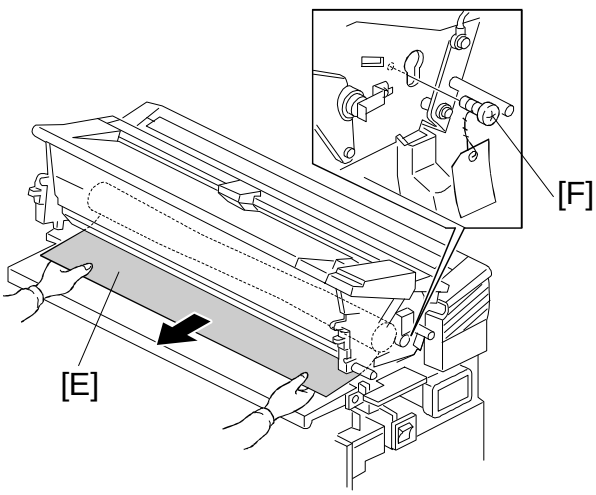

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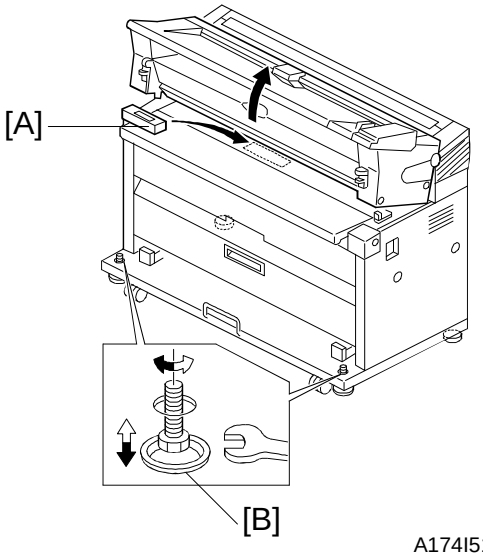
8. Remove the strips of filament tape [A] from the 1st and 2nd roll feed unit.
9. Open the paper path section [B] and remove the two strips of shipping tape [C] and protection sheet [D].
10. Remove the drum protection sheet [E], and remove the screw [F] to apply cleaning blade pressure to the drum.



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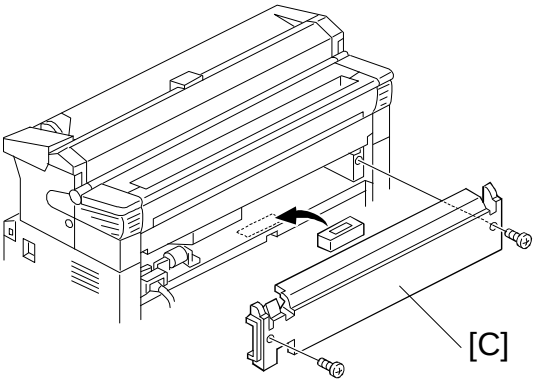

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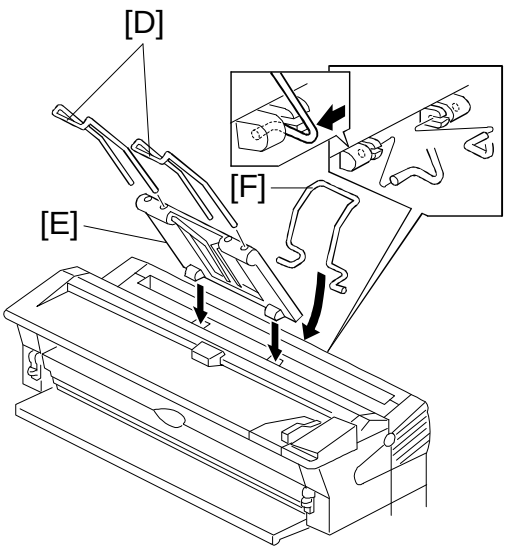

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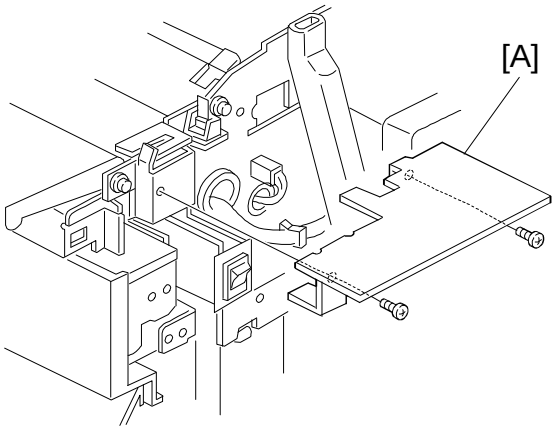
11. Open the paper path section, and place a level [A] in the middle of the guide plate as shown in the illustration. Adjust the level of the machine by turning the bolts [B] on the four Machine feet.
12. Remove the rear cover [C] (2 screws), and place the level in the middle of the base as shown in the illustration. Adjust the level of the machine in the same way.
13. Attach the guide wires (short ones) [D] to the copy tray [E].
14. Install the copy tray [E] and copy guide [F]:



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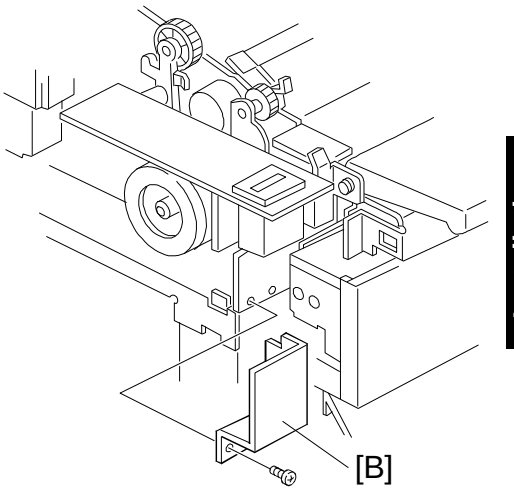

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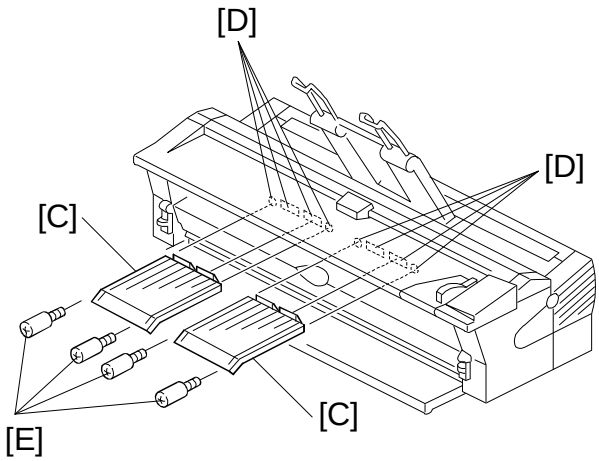

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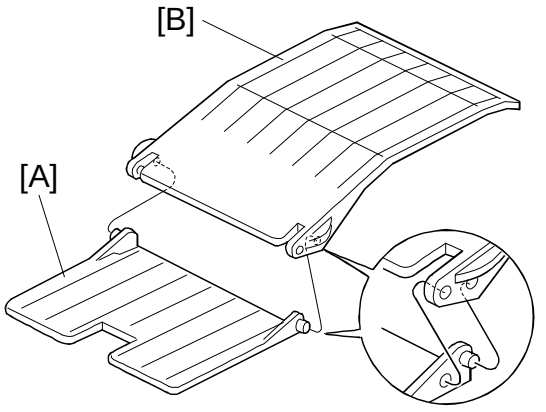
15. Install the right inner cover [A] (2 - M4 x 6 screws) and the total counter cover [B] (1 - M4 x 8 tapping screw).
16. Hook the original guides [C] into the cutouts [D] in the stay and install the pin screws [E].



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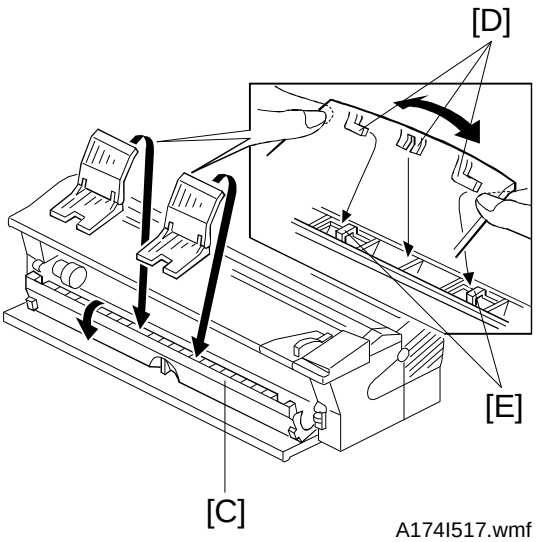

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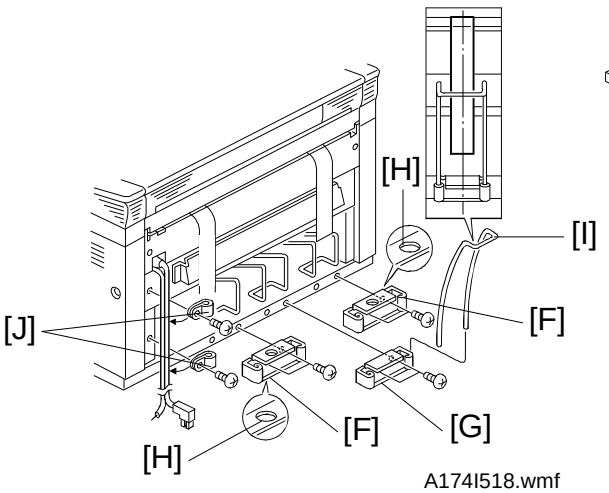

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17. Connect the original trays (original tray 1 [A] and 2 [B]).

18. Open the toner cartridge cover [C] and hook the tabs [D] on the original tray into the metal fittings [E].

    NOTE: 1) Slightly bend the original tray as shown by the arrows in the illustration.

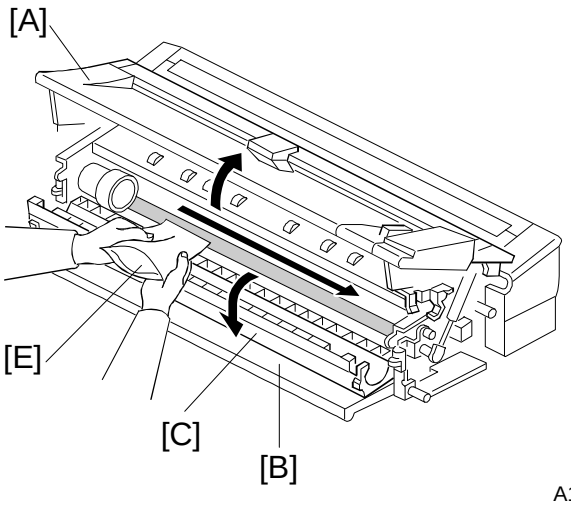
    2) Close the paper path section while installing the original trays. Otherwise, the toner cartridge cover will drop.

19. Install the two end guide stocker holders [F] (2 - M4 x 6 screws each) and 1 middle guide stocker holder [G] (2 screws).

    NOTE: To distinguish between the two types of the holders, there are holes [H] in the end guide stocker holders.

20. Set the three guide stockers [I].

21. Fix the power supply cord (2 nylon clamps [J] and 2 screws).



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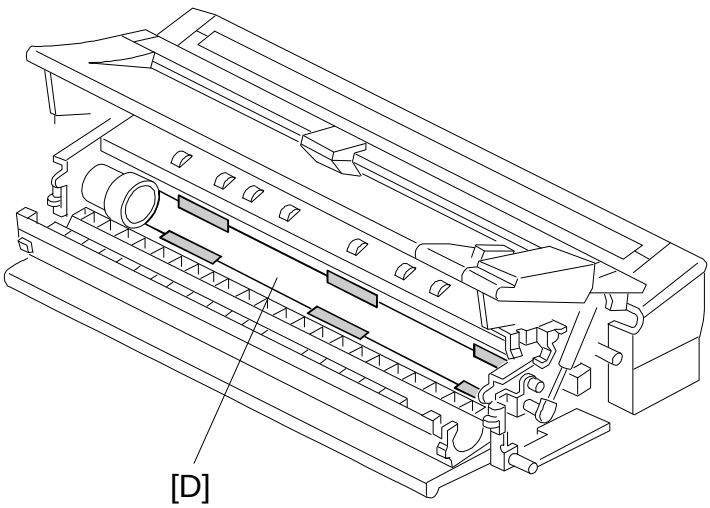

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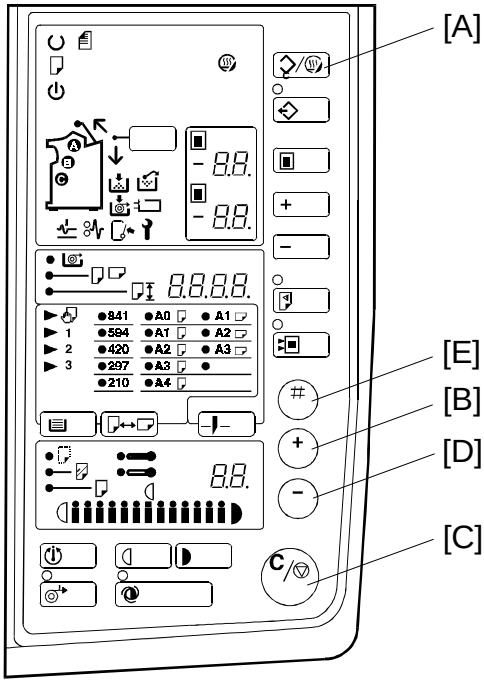
22. Open the original feed unit [A], manual feed table [B], and toner supply cover [C]. Remove the sheet [D] covering the developer entrance. Pour 1 kg of developer [E] into the development unit evenly across its width as shown.

23. Close the toner supply cover and original feed unit. Plug in the power supply cord and turn on the main switch.



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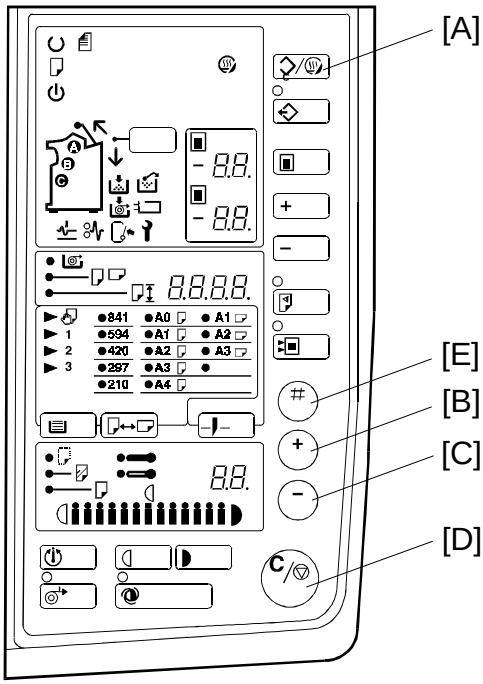
NOTE: If the fusing temperature is lower than 60 C when the main switch is turned on, the development motor will rotate. In this case, it is not necessary to access the SP mode to load the total 2 Kg of developer (steps 25 to 28).
Turn off the main switch to stop the development motor after the developer is loaded from the development entrance. Then, pour in another 1 kg of developer.

24. Press the following keys on the operation panel:
    Clear Modes/Stand-by key [A]
    + key [B]
    + key
    Clear/Stop key [C]

25. Press the "Clear/Stop" key again for longer than 3 seconds. The wrench and tone end indicators will blink (SP INPUT/OUTPUT mode).

26. Select 28 using the "+" key and "–" key [D] and press the "#" key [E]. The development motor will rotate.

27. Press the "#" key to stop the development motor after the developer is loaded from the development entrance. Pour another kg of developer into the development unit evenly across its width (Total: 2 kg). Press the Clear Modes/Stand-by key 3 times to leave the SP mode.



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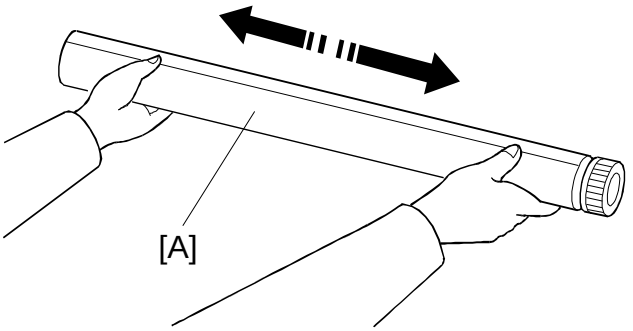
28. Press the following keys on the operation panel:
    Clear Modes/Stand-by key [A]
    + key [B]
    – key [C]
    Clear/Stop key [D]

29. Press the "Clear/Stop" key again for longer than 3 seconds. The roll paper end and wrench mark indicators will blink (SP mode).

30. Select 40 using the "+" and "–" keys. Enter "1" by pressing the following keys.
    # key [E]
    + key
    # key

Five minutes later, the copier will automatically return to the normal operation mode from SP mode.



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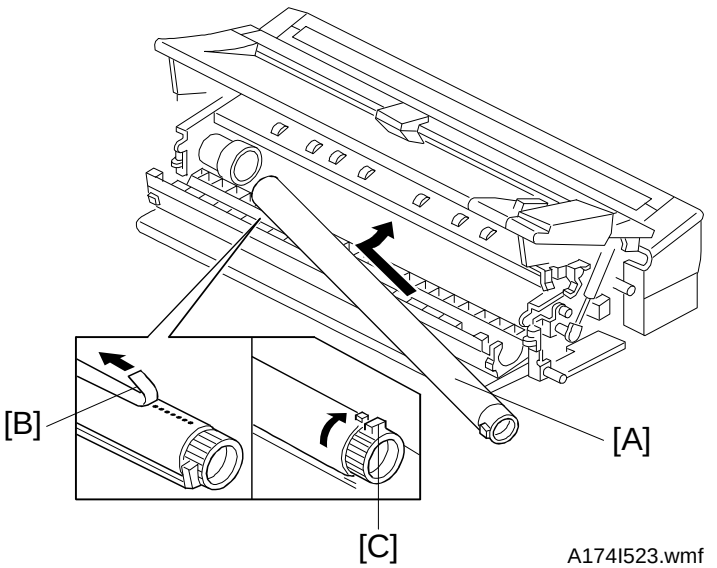

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31. Shake a new toner cartridge [A] gently 5 to 10 times to remove the lumps.
32. Install the toner cartridge [A] as shown.
    Remove the sealing tape [B] from the cartridge and turn the knob [C] until it stops.
33. Reinstall all the covers.
34. Check the copy quality and copier operation.

3. ROLL FEEDER INSTALLATION PROCEDURE (A613)

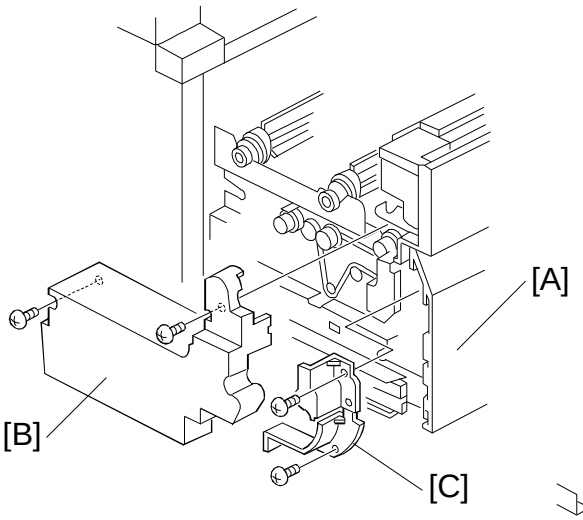
3.1 ACCESSORY CHECK

⚠ CAUTION

Unplug the copier power cord before starting the following procedure.

Check the accessories and their quantities against the following list:

Description	Q'ty
1. 3rd Feeder Harness	1
2. Bushing	1
3. Roll End Sensor Stay	1
4. Left Guide	1
5. Screw - M4 x 6	7
6. Screw - M4 x 8	1
7. 3rd Clutch Unit	1
8. Interlock Switch Assembly	1
9. Oil Dumper Bracket	2
10. White Oil Damper	1
11. Blue Oil Damper	1
12. Oil Damper Holder	2
13. 3rd Roll Grip	1
14. 3rd Roll Decal	1
15. Paper Spool	1
16. Spring	1



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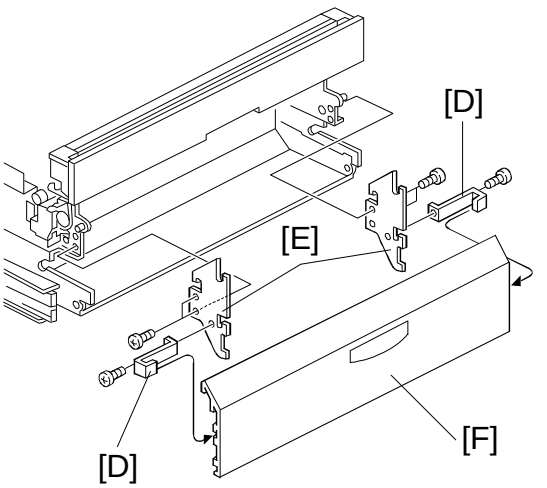

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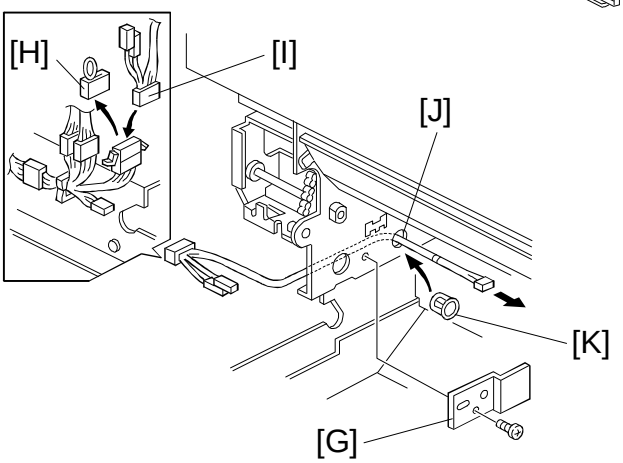

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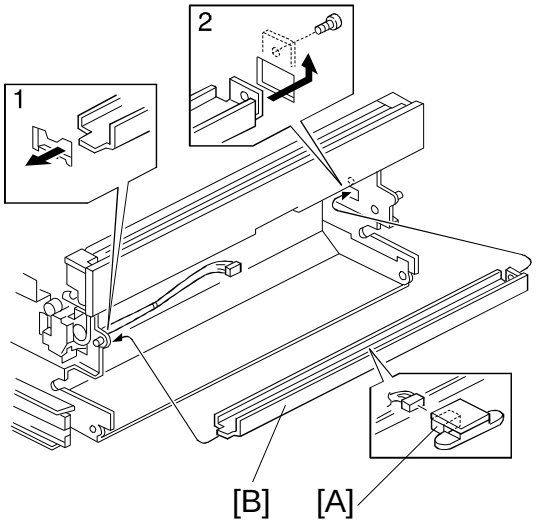
1. Pull out the 1st & 2nd roll feed unit [A]. Remove the left inner cover [B] and 3rd drive inner cover [C] (2 screws each).
2. Remove the 3rd cover securing plates [D] (1 screw each: right and left).
3. Remove the 3rd support plates [E] (2 screws each) and 3rd cover [F].
4. Remove the 3rd harness cover [G] (1 screw, left inside).
5. Replace the dummy connector [H] with the 3rd feeder harness connector [I]. Pass the 3rd feeder harness through the opening [J] and install the bushing [K] (inside).



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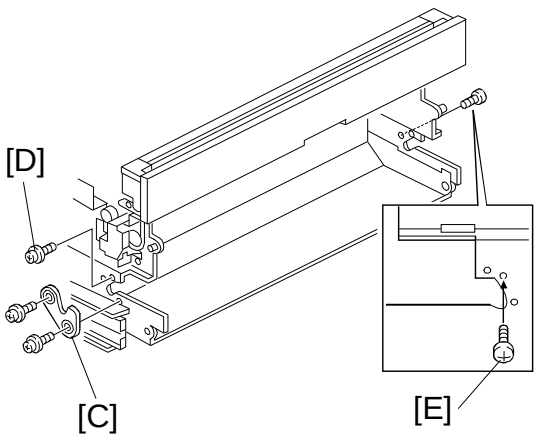

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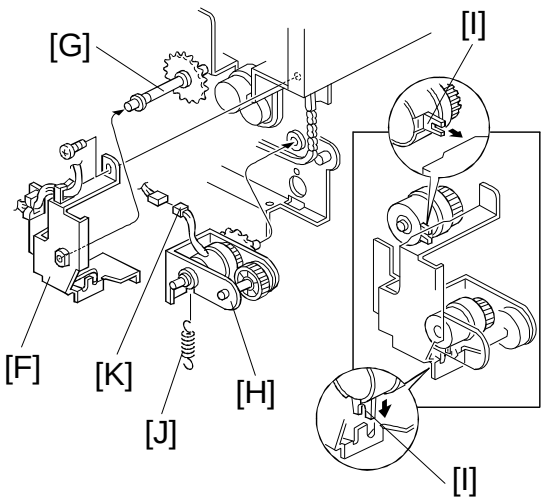

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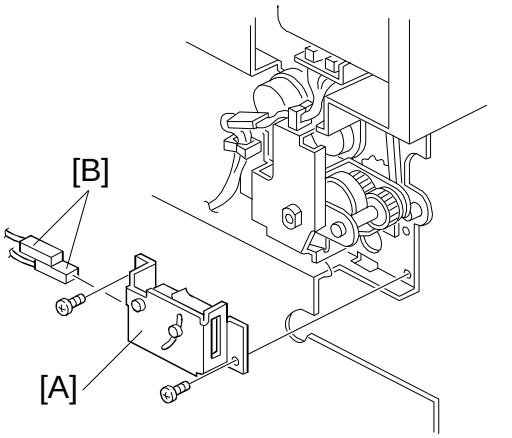
6. Connect the 3rd feeder harness to the roll end sensor connector [A] and install the roll end sensor stay [B] (1 - M4 x 6 screw, right).
7. Reinstall the 3rd harness cover.
8. Install the left guide [C] (2 - M4 x 6 screws) and install a M4 x 6 screw with washer [D] to the left and a M4 x 8 screw [E] to the right.
9. Remove the drive section bracket [F] (2 screws) and replace sprocket [G] with the 3rd clutch unit [H]. While fitting the clutch stoppers [I] to the drive section bracket, reinstall the drive section bracket.
10. Hook up the spring [J] and connect the 3rd feed clutch connector [K] to the red connector.



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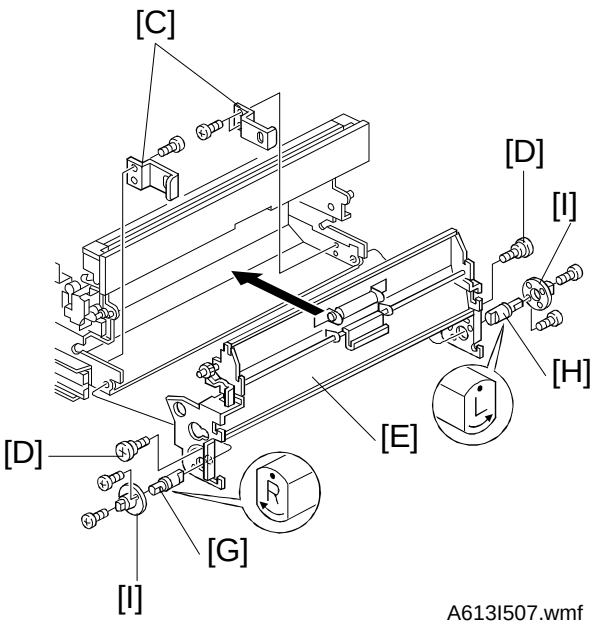

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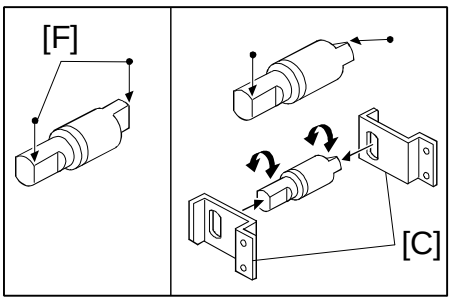

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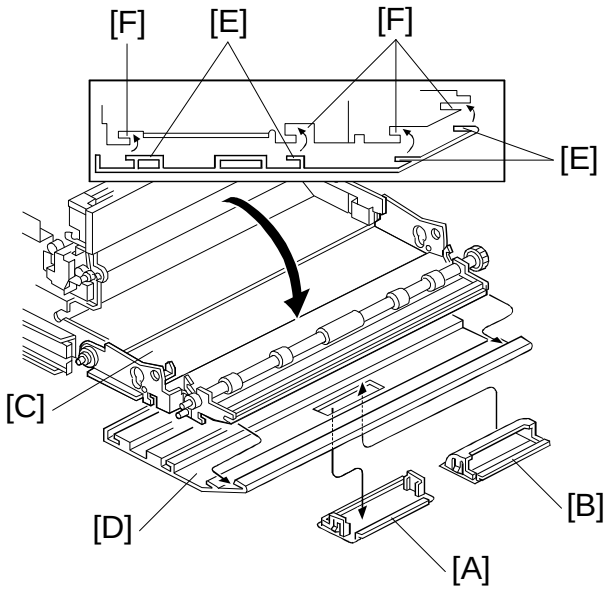
11. Install the interlock switch assembly [A] (2 - M4 x 6 screws and 2 connectors [B]).
12. Install the oil damper brackets [C] (2 - M4 x 6 screws) and remove the 2 shoulder screws [D].
13. Hook the 3rd feed unit [E] on the feed side plates.

NOTE: Confirm that the ends [F] of the oil dampers are aligned as shown before carrying out the next step. If they are not, correct the direction using the oil damper brackets [C] as shown.
Otherwise, the damper may be broken.

14. **Close the 3rd feed unit.** Install the white oil damper [G] to the left and blue oil damper [H] to the right.

    NOTE: Although R or L is indicated on the dampers, however, R should be set to the left and L should be set to the right.

15. Install the oil damper holders [I] (2 - M4 x 6 screws with washers) and reinstall the shoulder screws in the original position. Make sure that the 3rd feed unit door opens slowly and closes easily.



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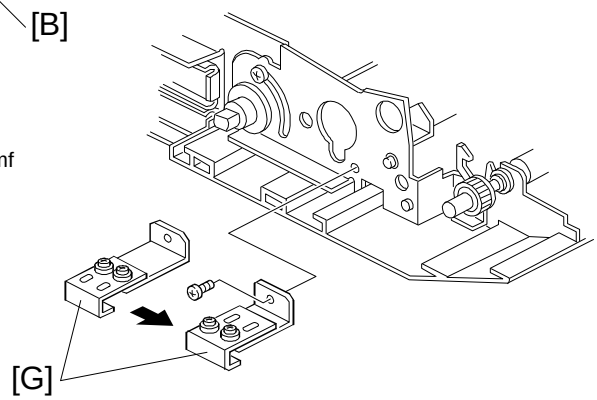

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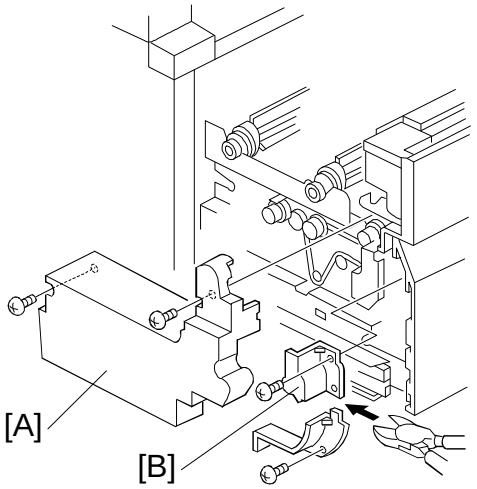
16. Replace the 3rd cover cap [A] of the 3rd cover with the 3rd roll grip [B].

    NOTE: The 3rd cover open lever should come out of the 3rd roll grip [B] for the next step.

17. Open the 3rd roll feed unit [C] and install the 3rd cover [D] (Hook the projections [E] onto the cutouts [F] in the roll feeder side plates.).

18. Change the screw positions of the 3rd cover securing plates [G] as shown and install the 3rd cover securing plates (1 screw each).



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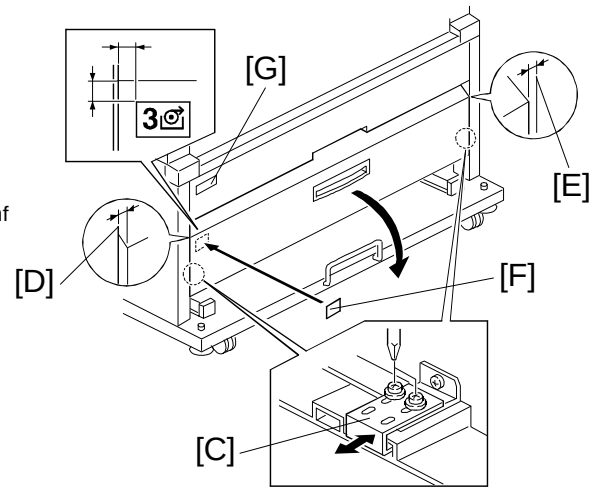

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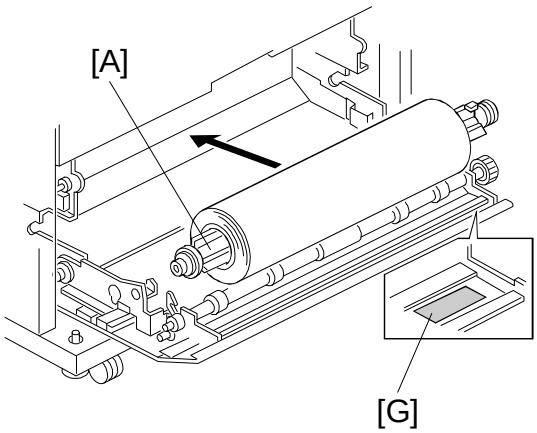
19. Reinstall the left inner cover [A] (2 screws).

20. Remove the upper part [B] from the 3rd drive inner cover using cutting pliers. Install the upper part on the left side plate (2 screws). The lower part is not necessary.

21. Adjust the plate positions [C] so that the the gaps [D and E] between the 3rd cover and copier side plates are the same.

22. Attach the 3rd roll decal [F] to the left upper part of the 3rd cover as shown. (Align it with the 1st & 2nd roll feed decal position [G].)



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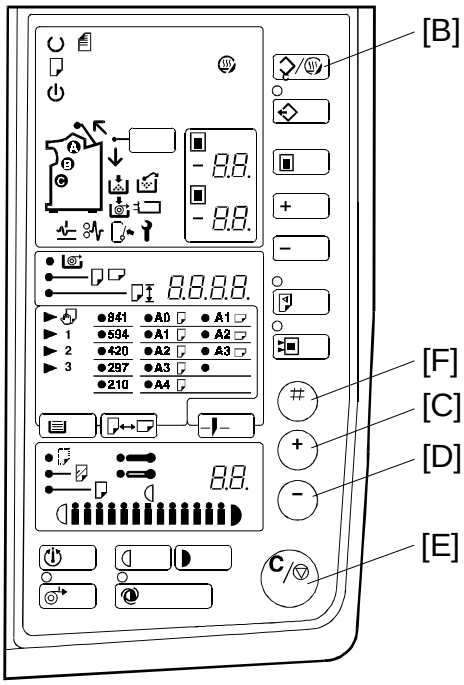

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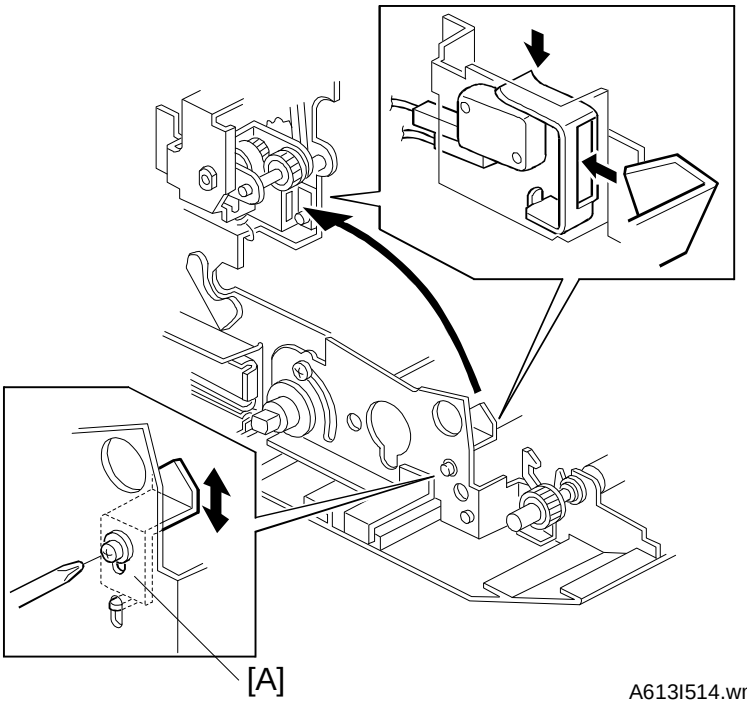
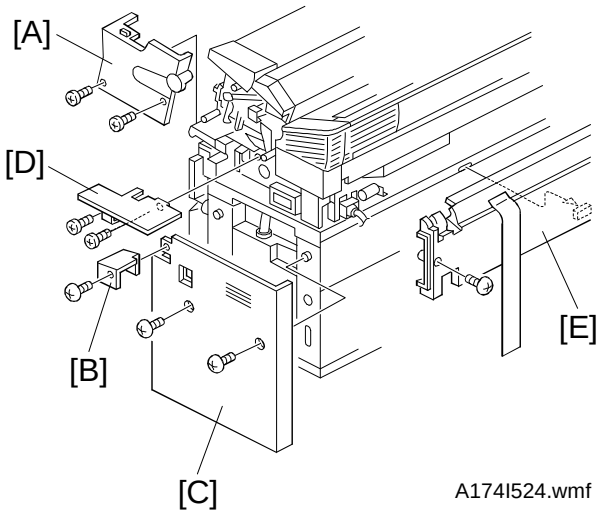
23. Set the paper spool [A] on the 3rd roll feeder.
24. Plug in the power supply cord and turn on the main switch.
25. Press the following keys on the operation panel:
    Clear Modes/Standby key [B]
    + key [C]
    - key [D]
    Clear/Stop key [E]
26. Press the "Clear/Stop" key again for longer than 3 seconds. The roll paper end and wrench mark indicators will blink (SP mode).
27. Select 44 using the "+" and "–" keys. Enter "1" by pressing the following keys.
    # key [F]
    + key
    # key
28. Input values into SP modes –48 and –49 in accordance with the decal [G] that is attached to the inside of the 3rd feed cover.
29. Press the "Clear Modes/Stand-by" key 3 times to leave the SP mode.

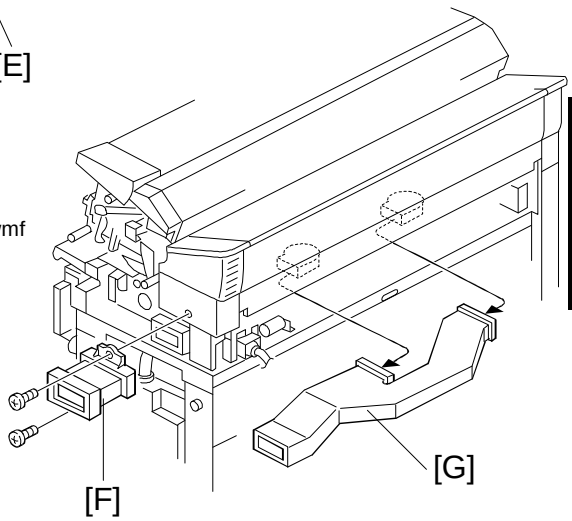


30. If the door open indicator lights when the 3rd roll feed door is closed, adjust the position of the interlock switch bracket [A].
31. Check the roll feeder operation.

4. KEY COUNTER HOLDER INSTALLATION



A174I524.wmf



A174I525.wmf

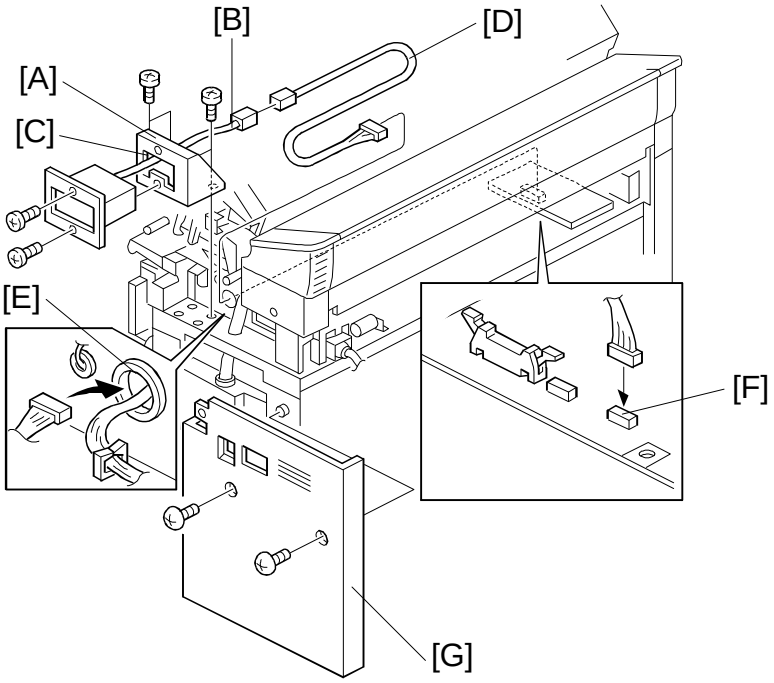
⚠ CAUTION

Unplug the copier power cord before starting the following procedure.

NOTE: The Key Counter Bracket Set includes the following parts. The key counter holder and key counter should be procured locally.

1. Right Lower Cover 1
2. Key Counter Bracket 1
3. Key Counter Harness 1
4. Screws 6

1. Remove the right upper front cover [A] (2 screws), right corner cover [B] (1 screw), right lower cover [C] (2 screws) , right inner cover [D] (2 screws), rear cover [E] (2 screws).
2. Remove the ozone filter unit [F] (2 screws) and duct [G].



A174I526.wmf

3. Install the key counter bracket [A] (4 screws).
4. Pass the key counter holder harness [B] through the opening [C]in the key counter bracket and install the key counter holder (2 screws). Connect the key counter holder harness to the key counter harness [D].
5. Pass the key counter harness through the opening [E] in the copier right side plate. Pass the the key counter harness through the clamps to the main control board and connect it to CN110 [F] of the main control board.
6. Install the right lower cover [G] included with the key counter bracket set (It is not necessary to use the used old right lower cover.). Re-install all the parts instead of the old right lower cover.
7. Plug in the copier power cord and turn on the main switch.
   Access SP No. 43 and input "1" (key counter installed).

SECTION 4

SERVICE TABLES

1. PREVENTIVE MAINTENANCE SCHEDULE

1.1 PM TABLE

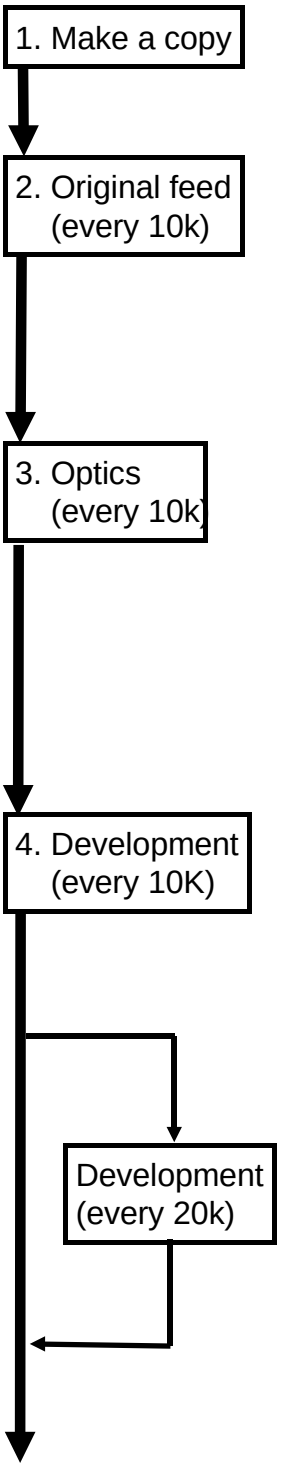
A: Adjustment C: Clean R: Replacement I: Inspect

PM Interval ( ) A1 sideways/D	EM	6 km (10k)	12 k m (20k)	18 k m (30k)	24 k m (40k)	Notes
Original Feed						
Original Feed Rollers		C	C	C	C	Alcohol
Original Table		C	C	C	C	Water or alcohol
Timing Belt, Chain	A					Adjust tension if jitter occurs
Optics						
ADS Sensor		C	C	C	C	Blower Brush
ADS Pattern		C	C	C	C	Alcohol
Fluorescent Lamp	C					Clean using water if necessary
Fiber Optics Array	C					Clean using dry cloth if necessary
Platen Roller	C	C	C	C	C	Water or alcohol
Exposure Glass	C	C	C	C	C	Water
Development						
Developer			R		R	
Side Seals		I	I	I	I	Replace if necessary
Cartridge Holder		C	C	C	C	Dry Cloth
Entrance Seal			C		C	
Development Filter			R		R	
Registration Upper Guide Plate		C	C	C	C	Dry Cloth
Cleaning						
Cleaning Blade			R		R	
Cleaning Seal		I	I	I	I	Replace if necessary
Used Toner Bottle		C	C	C	C	
Inside the Cleaning Unit		I	I	I	I	Clean if necessary
Around Drum						
Charge Corona Wire		C	R	C	R	Blower brush
Wire Cleaner Pad			R		R	
Grid Wire		C	C	C	C	Blower Brush
Charge Corona End Blocks and Casing		C	C	C	C	Dry Cloth
Quenching Lamp	C					Clean using a dry cloth if necessary

PM Interval ( ) A1 sideways/D	EM	6 km (10k)	12 k m (20k)	18 k m (30k)	24 k m (40k)	Notes
PTL		C	C	C	C	Dry cloth
Transfer Corona Wire		C	R	C	R	Dry cloth
Separation Corona Wire		C	R	C	R	Dry cloth
T & S End Blocks and Casing	C	C	C	C	C	Dry cloth
Pick-off Pawls		C	C	C	C	Dry cloth
Paper Feed						
Entrance Guide Plate		C	C	C	C	Water
Registration Roller		C	C	C	C	Water
Registration Roller Break		I	I	I	I	Clean if necessary
Vacuum Belt		C	C	C	C	Water
Vacuum Unit Guide Plate		C	C	C	C	Water
Manual Feed Table		C	C	C	C	Water
Roll Feeder						
Roll Feed Rollers (1st, 2nd and 3rd)		C	C	C	C	Water
Roll Exit Rollers		C	C	C	C	Water
Roll Lead Edge Sensor		C	C	C	C	Dry cloth
Cutter		C	C	C	C	Blower brush Replace at 120k (A1 sideways/D size)
Roll Feed Drive Chain		I	L	I	L	Mobil Temp. 78 Adjust tension if necessary
Fusing						
Hot Roller						Replace at 50k (A1 sideways/D size)
Pressure Roller						Replace at 60k (A1 sideways/D size)
Thermistors			C		C	Clean using suitable solvent
Hot Roller Strippers			C		C	Clean using suitable solvent
Pressure Roller Strippers			C		C	Clean using suitable solvent
Small Separation Rollers		C	C	C	C	Clean using suitable solvent

PM Interval ( ) A1 sideways/D	EM	6 km (10k)	12 k m (20k)	18 k m (30k)	24 k m (40k)	Notes
Fusing Entrance Guide Plate						Clean using suitable solvent if necessary
Fusing Exit Guide Plate						Clean using suitable solvent if necessary
Exit Turn Guide		C	C	C	C	Alcohol
Others						
Ozone Filters		R	R	R	R	
Timing Belts		I	I	I	I	Adjust tension if necessary
Chain		L	L	L	L	Mobil Temp. 78 Adjust tension if necessary
Photo Sensors		C	C	C	C	Dry cloth

1.2 REGULAR PM PROCEDURE



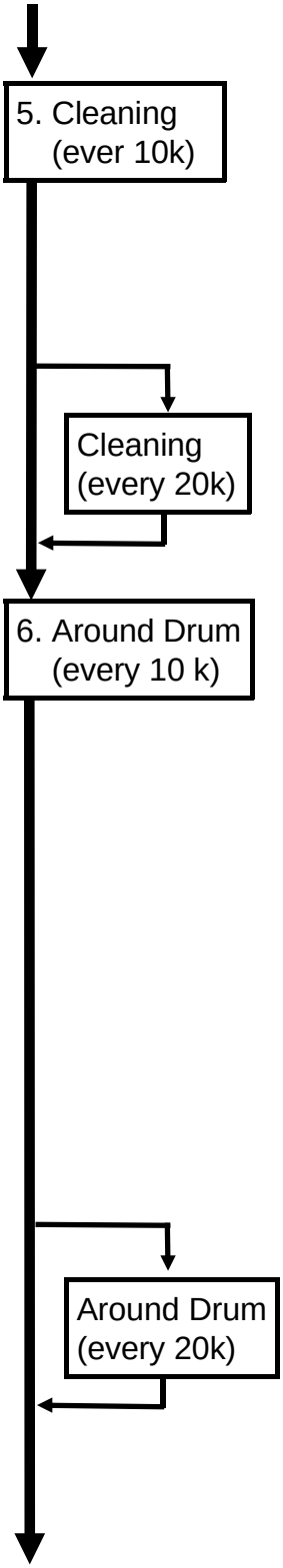
Make a copy of OS-A1 chart.

1. Clean the original feed rollers using alcohol.
2. Clean the original table using water or alcohol.

1. Clean the ADS sensor using a blower brush.
2. Clean the ADS pattern using alcohol.
3. Clean the platen roller using water or alcohol.
4. Clean the exposure glass using water.

1. Inspect the side seals. Replace them if necessary.
2. Clean the cartridge holder using a dry cloth.
3. Clean the registration upper guide plate using a dry cloth.

1. Replace the developer.
2. Replace the development filter.
3. Clean the entrance seal.

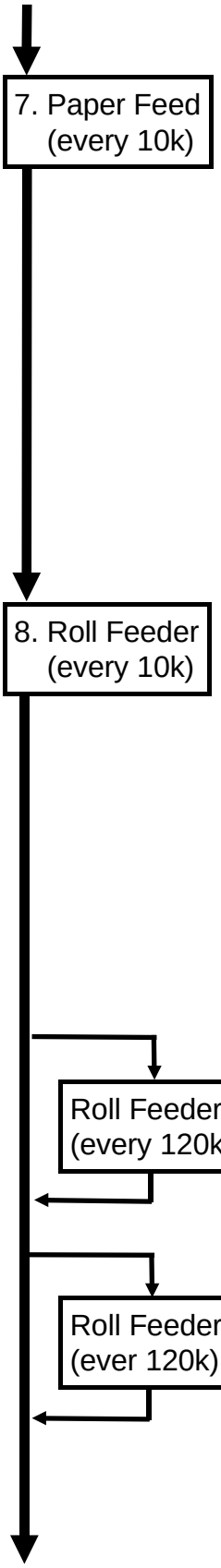


1. Clean the used toner bottle.
2. Inspect the cleaning seal. Replace if it is damaged.
3. Inspect inside the cleaning unit. Clean it if necessary.

Replace the cleaning blade.

1. Clean the charge corona wire using a blower brush.
2. Clean the grid wire using a blower brush.
3. Clean the charge corona end blocks and casing using a dry cloth.
4. Clean the PTL using a dry cloth.
5. Clean the transfer and separation corona wires using a dry cloth.
6. Clean the T & S blocks and casing using a dry cloth.
7. Clean the pick-off pawls using a dry cloth.

1. Replace the charge corona wire.
2. Replace the wire cleaner pad.
3. Replace the transfer and separation corona wires.

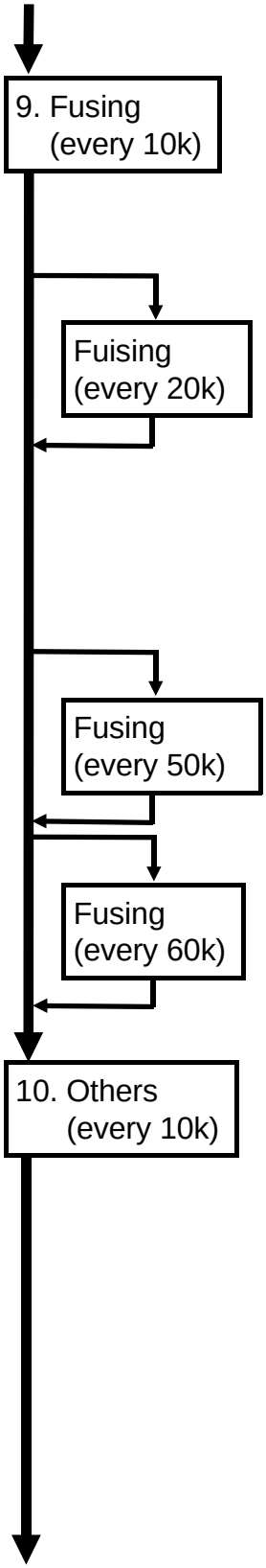


1. Clean the entrance guide plate using water.
2. Clean the registration roller using water.
3. Inspect the registration roller break and clean it if necessary.
4. Clean the vacuum belt using water.
5. Clean the vacuum unit guide plate using water.
6. Clean the manual feed table using water.

1. Clean the 1st, 2nd, and 3rd feed rollers using water.
2. Clean the roll exit rollers using water.
3. Clean the roll lead edge sensor using a dry cloth.
4. Clean the cutter using a blower brush.
5. Inspect the roll feed dirve chain. Adjust tension if necessary.

Lubricate the roll feed drive chain using Mobil temp. 78.

Replace the cutter.



1. Clean the small separation rollers using suitable solvent.
2. Clean the exit turn guide using alcohol.

1. Clean the thermistors using suitable solvent.
2. Clean the hot roller strippers using suitable solvent.
3. Clean the pressure roller strippers using suitable solvent.

Replace the hot roller.

Replace the pressure roller.

1. Replace the ozone filter.
2. Inspect the timing belts. Adjust tension if necessary.
3. Lubricate the drive chain using Mobil temp.78. Adjust tension if necessary.
4. Clean the photo sensors using a dry cloth.

11. Copy Quality (every 10k)

1. Check copy quality.
2. Perform the light sensor adjustment.

2. SERVICE TABLES

2.1 TEST POINTS

Charge/Bias/Grid Power Pack

Number	Function
TP1	Development Bias Voltage
TP2	Grid Voltage

2.2 VARIABLE RESISTORS

Charge/Bias/Grid Power Pack

Number	Function
VR1	Charge Corona Voltage

Caution: VR1 should not be changed in the field. Charge corona can be adjusted using SP mode.

T&S Power Pack

Number	Function
VRT	Transfer Corona Voltage
VRD (DC)	Separation Corona Voltage (DC)
VRD (AC)	Separation Corona Voltage (AC)

Caution: VRT, VRD (DC), and VRD (AC) should not be changed in the field. They can be adjusted using SP mode.

3. SERVICE TOOLS

3.1 SERVICE PROGRAM MODE

The service program (SP) mode is used to check electrical data, change mode or adjustment values.

3.1.1 Service Program Mode Access Procedure

How to access the SP mode for service representatives (All service program modes can be accessed with this procedure.)

Press the following keys in sequence.

The second time that the "Clear Stop" key is pressed, hold it down for more than 3 seconds (until the and in dicators blink).

How to access the SP mode for customers and sales representatives (SP modes 1 to 39 are accessible by a customer with this procedure.)

Press "Clear" key then hold down "Clear Stop" key more than 3 seconds (until the and indicators blink).

How to leave the SP mode

Press the following keys in sequence

or turn off the main switch.

NOTE: Each of the above procedure must be finished within 20 seconds.

How to select the program number

The program number can be selected by the "+" and "–" keys. The selected program number is displayed in the lead edge erase indicator (the two digit indicator beside the ■ mark).
To select the program number quickly, hold down "+" or "–" key.

How to change settings

1. Access the SP mode and select the program number.
2. Press the "#" key to select the paper length indicator (the four digit indicator).
3. The present setting is displayed in the paper length indicator.
4. Select the setting using the "+" and "–" keys, then press the "#" key to enter the selected setting.
5. Leave the SP mode.

How to read data

1. Access the SP mode and select the program number.
2. Press the "#" key and select the paper length indicator (the four digit indicator).
3. Press the "#" key, then the paper length indicator shows the data.
4. Press "#" key again to stop displaying the data.

3.1.2 Service Program Mode Table

1: A "*" before the mode number means that the mode can be accessed by custormers or sales representative.

2: In the data colum, the default value is printed in bold letters. The default settings for several items depend on the machine destination (refer to page 4-26.).

Mode No.		Function	Data
*1	Fusing Temperature 1 (Normal)	Selects the fusing temperature for plain paper.	1: Mode 1 **2: Mode 2** 3: Mode 3 4: Mode 4 5: Mode 5 6: Mode 6 7: Mode 7 8: Mode 8 9: Mode 9 10: Mode 10 11: Mode 11 12: Mode 12
*2	Fusing Temperature 2 (High)	Selects the fusing temperature for translucent paper.	1: Mode 1 2: Mode 2 3: Mode 3
*3	Fusing Temperature 3 (Low)	Selects the fusing temperature for translucent film.	1: Mode 1 2: Mode 2
*4	Copy Count Up/Down	Selects the copy count amount up or down.	0: Up 1: Down
*5	Beeper On/Off	Selects if the beeper sounds or not.	0: On 1: Off **2: Only when the edge margin or paper length is changed continuously, the beeper is off.**
*6	Original Feed Start Time Setting	Selects the time when the original feed roller starts rotating after the original set sensor is actuated.	**0: 2.5 seconds** 1: 3 seconds 2: 4 seconds 3: 5 seconds
*7	Original Feed Out Waiting Time Setting	Selects the time to when the original is automatically fed out after it has been set on the original table in manual feed mode.	**0: 2 minutes** 1: 1 minute 2: 3 minutes 3: 4 minutes 4: 5 minutes 5: No auto feed out

Mode No.		Function	Data
*8	Manual Feed Start Time Setting	Selects the time to when the registration roller starts rotating after the entrance sensor detects the paper leading edge in the manual feed mode.	**0: 2 seconds** 1: 3 seconds 2: 4 seconds 3: 5 seconds
*9	Manual Paper Feed Original Waiting Time	Selects the time when the machine indicates DJ92 if the original is not inserted after copy paper is set on the manual feed table.	**0: 2 minutes** 1: 1 minute 2: 3 minutes 3: 4 minutes 4: 5 minutes 5: No time limit
*10	Auto Reset Time Setting	Selects the time to return to the initial setting.	**0: 2 minutes** 1: 1 minutes 2: 3 minutes 3: 4 minutes 4: 5 minutes 5: No auto reset
*11	Auto Energy Saver Mode	The machine goes into energy saver mode at auto reset time.	**0: No** 1: Auto Energy Saver Mode
*12	Screen Message Setting	Selects one of the options indicated on the display in the energy saver mode.	**0: None** 1: Pre-HEAt 2: HEllo i lovE yoU 3: 0 1 2 3 4 5 6 7 8 9 4: SLEEPinG 5: HAvE A Good dAy.
*13	Auto Energy Saver Release	Energy saver mode is automatically released when an original is inserted.	**0: No** 1: Yes
*14	Leading Edge Increase/Decrease Speed Setting	To change the leading edge margin (print number) increase/decrease speed, the customer holds down the + or – key. Then, after a few 0.25 second intervals (See SP mode 16), the speed begins to change. This mode determines the rate of speed increase/decrease.	Count up/down at every: **0: 0.1 second** 1: 0.5 second 2: 0.25 second 3: 0.05 second 4: 0.02 second
*15	Paper Length Up/Down Speed Setting	To change the paper length increase/decrease speed, the customer holds down the + or – key. Then, after a few 0.25 second intervals (See SP mode 16), the speed begins to change. This mode determines the rate of speed increase/decrease.	**0: 0.1 second** 1: 0.5 second 2: 0.25 second 3: 0.05 second 4: 0.02 second 5: 0.01 second
*16	Leading Edge Increase/Decrease Adjustment Preliminary Interval	The leading edge margin (print number, paper length) increase/decrease speed starts to change several 0.25 second intervals after the customer starts the adjustment procedure. This SP mode adjusts the number of 0.25 second intervals.	**0: 3 intervals** 1: 1 intervals 2: 2 intervals 3: 5 intervals 4: 10 intervals

Mode No.		Function	Data
*17	Paper Length Up/Down Step Setting	If a customer holds the + or - key to change the paper length, the speed begins to change after a few (SP16) 0.25 second intervals. This setting determines the length of one step increment after the speed changes.	(In mm mode) **0: 1 mm** 1: 10 mm 2: 100 mm 3: 50 mm 4: 60 mm 5: 120 mm 6: 200 mm 7: 240 mm 8: 250 mm 9: 500 mm 10: 600 mm (In inch mode) **0: 0.1 inch** 1: 1.0 inch 2: 10.0 inch 3: 5.0 inch 4: 6.0 inch 5: 12.0 inch 6: 20.0 inch 7: 24.0 inch 8: 25.0 inch 9: 50.0 inch 10: 60.0 inch
*18	Image Density Setting In ADS Mode	Selects the image density in ADS mode.	0: Darkest 1: Darker 2: Dark **3: Normal** 4: Light 5: Lighter 6: Lightest
*19	Auto Shut-off Time Setting (115 V machines only)	Determines the auto shut-off time.	1 ← **30** → 120 (1 minute step)
*20	Synchro-cut/ Manual Feed Display	Determines whether "Auto (when synchro cut mode is selected)" or "HAnd (when by-pass feed mode is selected)" is displayed on the copy counter.	0: No display 1: "Auto" only 2: "HAnd" only 3: "Auto" and "Hand"
*21	Cut Mode for the Partial Copy Setting	Determines which cut mode is automatically selected when the partial copy is selected.	0: Keeps the present setting **1: Synchro cut** 2: Preset cut 3: Variable cut
*22	Partial Copy Start Position Adjustment	Adjust the position where the image area of partial copy starts. To start developing the image area earlier, increase the number to minus direction.	In mm mode –99 ← **0** →+99 (mm) In inch mode –4.0← **0** → +4.0 (inch)

Mode No.		Function	Data
*23	Original Acceptation Time Setting	Determines the timing when the Set Original indicator lights after previous original is scanned.	**0: Original can be inserted before the previous original is completely fed out.** 1: Original can be inserted after the previous original is completely fed out and the original transport motor stops.
*24	Original Hold Mode	After original scanning is finished, the original exit roller stops before completely feeding out the original. This is to prevent the original from dropping on the floor after scanning. The original is fed out when the Clear/Stop key is pressed or when the next original is inserted.	0: No **1: Original Hold mode does not function in Auto Start mode, or when the original is fed out after the Emergency Stop key is pressed.** 2: Original Hold mode always functions.
*25	Original Feed Start Time Setting -Long Narrow Original Mode	Selects the time when the original registration roller starts rotating after the original lead edge sensor is actuated.	**0: 3 seconds** 1: 4 seconds 2: 5 seconds 3: 6 seconds
*26	Program Function Display	Determines whether "Job Call" or "Job Recall" is displayed when the program function is used.	0: Job Call 1: Job Recall 2: No display
*27	Paper Length Count Up/Down Setting	Selects if the paper length is in count down or up when the preset cut key is pressed.	**0: Down** (Long → Short) 1: Up (Short → Long)
*28	Fixed Paper Size Pattern Setting	Selects the fixed paper size pattern chosen when the "Preset Cut" key is pressed.	Refer to page 4-37.
*29 to 38	Optional Paper Size Setting	Up to 10 different paper size can be stored from 29 to 38. If "19" is selected in SP No. 29, this data is used as fixed paper size when the "Preset Cut" key is pressed.	UdEF: Undefined
*39	All Indicators On	Turns on all the indicators on the operation panel when the Enter key is pressed.	**0: No** 1: All indicators on

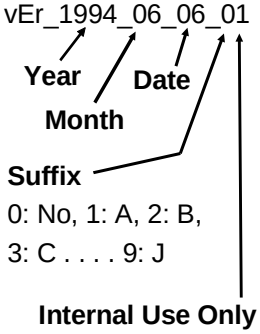
Mode No.		Function	Data
40	New Developer Initialization	Carries out the new developer initialization for 5 minutes. The machine counts down the remaining time on the display. After the initialization, the machine automatically adjusts the toner sensor output to 3.9 ± 0.1V. During the toner sensor adjustment, "Adj" is displayed. When the adjustment is completed, the machine automatically returns to normal operating mode.	If the initialization is canceled before returning to the normal operating mode, do it again from the beginning. If the machine fails to adjust the toner sensor output, "E–16" is indicated.
41	Release Fusing Unit and Main Switch Service Call	Recovers from the fusing unit and Main Switch SC condition. After it has been recovered, the machine returns to its initial (power on) condition.	**0: Release SC** 1: SC condition
42	Not Used		
43	Key Counter Identification	Enables key counter operation.	**0: No** 1: Yes 2: For Japanese machines only 3: For Japanese machines only
44	3rd Roll Feeder Identification	Enables 3rd roll feeder operation.	**0: No** 1: Yes
46			
48	Key Counter Unit Setting	Selects the unit in which the total counter counts up by.	**0: Same as the total counter unit** 1: 1/10 of the total counter unit (If 4, 5, or 6 is selected in SP-2, the key counter unit becomes the same as the total counter unit.)
49	Not Used		
50	Developer Warm-up Setting	Determines the warm-up time to increase the Q/M of the developer. This warm-up is done if the fusing temperature is lower than 60°C when the main switch is turned on.	**0: 1 minute** 1: 2 minute 2: 3 minute 3: None
51	ADS Customer Setting	Specifies whether a customer can change the image density in ADS mode by pressing the density keys.	**0: No** 1: Yes
52	Copy Number Limit Setting	Determines the maximum copy number.	**0: 10 sheets** 1: 20 sheets 2: 50 sheets 3: 99 sheets

Mode No.		Function	Data
53	Repeat Copy Length Limit Setting	Determines the maximum copy length for repeat copy.	(In mm mode) **0: 1200 mm** 1: 1500 mm (In inch mode) **0: 49 inch** 1: 60 inch (common) 2: The maximum paper length determined by SP54.
54	Paper Length Limit Setting	Determines the maximum paper length. **Note:** If paper longer than 3600 mm is used, skew copy, poor fusing, crease copy original damage might occur.	(In mm mode) **0: 3600 mm** 1: 6000 mm 2: 9999 mm 3: No limit (In inch mode) **0: 142.0 inch** 1: 236.0 inch 2: 394.0 inch 3: No limit
55	Paper Buckle Timing Setting	Normally, paper buckle for roll cutting is made before the image transfer starts. If the setting of SP55 is changed to 1, and a customer keeps pressing the Paper Size key for more than 3 seconds, the buckle is made just before the roll paper is cut. This stabilizes the paper transportation and minimizes creasing of long sheet. However if this mode is selected, the paper cut length will become 62.6 mm longer than original when Synchro-cut is selected.	**0: Paper buckle making timing can not be changed.** 1: Paper buckle making timing can be changed.
56	Disable Original Exit Jam Detection	Determines whether original exit jam detection is done or not.	**0: Done** 1: Not done
57	Original Return Speed Setting	Selects the original return speed in the repeat copy.	**0: 320 mm** 1: 130 mm
58	Manual Feed Repeat Copy Setting	Enables repeat copy in manual feed mode.	**0: No** 1: Yes
59	Cut Timing At Roll End Setting	Determines whether the roll paper is immediately cut when the roll end condition is detected, or continues feeding if the remaining paper feed length is shorter than the actual roll end length. This setting should be changed depending on if the end of paper is glued covering all the core surface or not.	0: Continues Feeding 1: Cut immediately

Mode No.		Function	Data
60	Auto Fusing Temperature Change	Determines whether the fusing temperature is automatically changed when a different paper mode is selected, or not.	**0: Auto change (Start key is disabled until the fusing temperature reaches target value.)** 1: Manual selection (Fusing temperature is changed only by the Fusing Temperature key.) Operators must select the temperature and paper media. 2: Auto selection (Start key is accepted even if the fusing temperature have not reached the target value.)
61	Fusing Temperature Recovery Setting	Determine how the machine recovers when the fusing temperature becomes lower than the target value during repeat copy operation.	0: No recovery (The machine simply continues copy operation ignoring the fusing temperature. **1: Stops copy operation and feeds out the original.** 2: Stops copy operation but the original is not fed out. The copy operation starts again after the fusing temperature recovers. 3: Decreases copy speed and continues copy operation.

<table>
<tr><th colspan="2">Mode No.</th><th>Function</th><th>Data</th></tr>
<tr><td>62</td><td>Auto Copy Exit Change</td><td>Selects whether the copy exit is automatically selected depending on the copy length, or not.

<table><tr><td>Pre-set Cut</td><td>Longer than 710 mm</td><td>Lower Exit</td></tr><tr><td>Variable Cut</td><td>Shorter than 710 mm</td><td>Upper Exit</td></tr><tr><td rowspan="2">Synchro cut</td><td>Longer than 614 mm</td><td>Lower Exit</td></tr><tr><td>Shorter than 614 mm</td><td>Upper Ecit</td></tr></table></td><td>0: No
1: Auto Copy Exit Change</td></tr>
<tr><td>63</td><td>Roll End Jam Setting</td><td>Selects the machine operation when the roll end condition could not be detected by the roll end sensor; whether PJ64 is displayed (in this case, the machine stops leaving paper inside the machine), or the roll end indicator lights after exiting the paper.</td><td>0: PJ64
1: Roll end</td></tr>
<tr><td>64</td><td>Special Toner Supply Mode</td><td>In the energy saver mode, 10% toner supply is done while the "Emergency Stop" key is pressed. Toner sensor voltage is displayed on the "Paper Length" indicator. If the voltage is lower than 1V, toner is not supplied.</td><td>0: No
1: Special Toner Supply Mode</td></tr>
<tr><td>66</td><td>Toner End Detection Setting</td><td>Determines the possible number of copies (when A1 paper is used) after the toner near end condition.</td><td>0: 27 sheets
1: 9 sheets
2: 18 sheets
3: 36 sheets</td></tr>
<tr><td>67</td><td>Toner Overflow Detection Setting</td><td>Determines the number of available copies after the toner near overflow condition is detected.</td><td>0: 34 sheets
1: 11 sheets
2: 23 sheets
3: 45 sheets</td></tr>
<tr><td>68</td><td>Charge Corona Wire Cleaning Interval</td><td>Determines the number of copies (when A1 copy is used) for the charge corona wire cleaning internal.</td><td>0: 0 sheet
1: 100 sheets
2: 200 sheets
3: 300 sheets
4: 400 sheets
5: 500 sheets</td></tr>
<tr><td>70</td><td>SP Mode Display Speed Setting</td><td>Selects the indication speed on the display.</td><td>0: 300 ms/letter
1: 100 ms/letter
2: 200 ms/letter
3: 400 ms/letter
4: 500 ms/letter</td></tr>
</table>

Mode No.		Function	Data
71	ROM Version Display	Indicates the ROM version.	Example: vEr_1994_06_06_01 
72	OPC Counter	Displays the total length of copied paper after the OPC drum is installed.	do = XX,XXX This counter should be cleared when the OPC drum is replaced. (SP#–1)
73	Developer Counter Display	Displays the total length [m] of copied paper after the new developer is poured.	dE = XX,XXX This counter is automatically cleared when the new developer initialization is done.
74	Toner Counter Display	Displays the total length of copied paper [m] after a new toner cartridge is installed.	dt = XX,XXX This counter is automatically cleared when the new toner cartridge is installed.
75	Used Toner Counter	Indicates the copy length after clearing the used toner counter.	dF = XX,XXXX (Beeper) This counter is automatically cleared if the used toner bottle is replaced with new one or emptied.
76	Charge Corona Wire cleaning Counter	Displays the total length of copied paper after the last charge corona wire cleaning is done.	dc = XX,XX (m)

Mode No.		Function	Data
77	Toner Supply Level Indication	Indicates the present toner sensor level.	dL = ab – – c a: Toner density setting n, H, L b: TS level 0 ~ 5 c: Copy length step 1: ~30m 2: ~60m 3: ~90m 4: ~120m 5: ~150m 6: 150m ~
80 to 86		Displays the total copy length/number according to the following units: SP80 = Yard SP81 = meter SP82 = 100 inches SP83 = 50 inches SP84 = A1 length (594 mm) SP85 = sheet (any size) SP86 = feet The copy length of each feed station can be displayed separately. It can be changed by pressing the Paper Select key. t1 to t3: Roll Feed tF: Total tH: Manual Feed	
87	Total Cutter Counter	Displays the total cutter count.	ct = XXX,XXX
88	Total Charge wire Cleaner counter	Display the total charge wire cleaner counter.	cl = XXX
90	Number of Misfeeds	Displays the total number of misfeeds in the cut length indicator. Misfeed location codes is displayed in the trailing edge margin counter. The counter displayed can be selected by pressing the Paper Select key.	J❑ = XXX tJ = Total Jam tH = Manual Feed Jam t1~3 = Roll Feed Jam
91	Original Jam Counter	Displays the total number of original misfeeds.	dJ = X, XXX

Mode No.		Function	Data
92	Number of Misfeeds by Location	Displays the number of misfeeds by location on the cut length indicator. Misfeed location code is displayed in the trailing edge margin counter. The counter displayed can be selected by pressing the Paper Select key.	PJ = Number of total jam before the registration sensor FJ = Number of total jam detected after the registration sensor PH = Number of manual feed jam detected before the registration sensor FH = Number of manual feed jam detected after the registration sensor P1 to P3 = Number of roll feed jam detected before the registration sensor F1 to F3 = Number of roll feed jam detected after the registration sensor (1 to 3: 1st to 3rd roll feed)
93	Copy Paper and Original Misfeed Record Display	Displays the locations of the last five misfeeds one after the other.	J1 = XX (Last jam) ↓ J2 = XX (1 before the last jam) ↓ J3 = XX (2 before the last jam) ↓ J4 = XX (3 before the last jam) ↓ J5 = XX (4 before the last jam) ↓ Beeper (XX = Jam Location)

Mode No.		Function	Data
94	Original Misfeed Record Display	Displays the locations of the last five original misfeeds one after the other.	d1 = XX (Last jam) ↓ d2 = XX (1 before the last jam) ↓ d3 = XX (2 before the last jam) ↓ d4 = XX (3 before the last jam) ↓ d5 = XX (4 before the last jam) ↓ Beeper (XX = Jam Location)
95	Copy Paper Misfeed Record Display	Displays the location of the last five copy paper misfeeds one after the other.	P1 = XX (Last jam) ↓ P2 = XX (1 before the last jam) ↓ P3 = XX (2 before the last jam) ↓ P4 = XX (3 before the last jam) ↓ P5 = XX (4 before the last jam) ↓ Beeper (XX = Jam Location)
97	Number of Service Calls by Location	Displays the total number of service calls (SC) by location in the cut length indicator. SC codes is displayed in the trailing edge margin counter.	E❑ = XXX tE = Total SCs

Mode No.		Function	Data
98	Service Call Records	Displays the last five service calls one after the other.	E_1 = XX (The last error code) ↓ E_2 = XX (1 before the last error code) ↓ E_3 = XX (2 before the last error code) ↓ E_4 = XX (3 before the last error code) ↓ E_5 = XX (4 before the last error code) ↓ Beeper (XX = Error Code)
99	Not Used		

Mode No.		Function	Data
–1	RAM Clear	Clears selected data items form the RAM. To clear the memory, input the number of the item you want to delete, then press the "#" key. **Note1:** If all the memory is cleared (if a number from 20 to 36 is selected), re input the factory settings that are shown on the decal attached inside the upper right cover. Please refer to page 4-27 to know the default settings for each destination. (When No. 10 to 26 is selected.) **Note 2:** This counter is not used for the toner density step control (described on page 2-16).	0: Not Used 1: Copy Number Counter (The memory for SP85) 2: Copy Length Counter (SP80 to 84 and 86) 3: OPC Counter (SP72) 4: Developer Counter (SP73)**(Note1)** 5: Toner Counter (SP74) **(Note2)** 6: Used Toner Counter (SP75) 7: Charge Corona Wire Cleaner counter (SP76) 8: Not Used 9: Not Used 10: Cleaner data No. 1 to 19 11: Jam Counter (SP90 to 95) 12: SC Counter (SP97 and 98) 13: Total Cutter Counter (SP87) 14: Total Charge Corona wore Cleaner Counter (SP88) 15 to 19: Not Used 20: Change the settings to the Japan version

Mode No.		Function	Data
–1			21: Change the setting to the U.S.A. version 22: Change the setting to the Europe version 23: Change the setting to the Asia version 24: Charge the settings to the Hoechst version 25:Change the settings to the Regma version 26: Change the settings to the K+E version 27: Not Used 28: Not Used 29: Factory use 30: Clear all the memories and change the setting to the Japanese version 31: Clear all the memories and change the setting to the U.S.A. version 32: Clear all the memories and change the setting to the Europe version 33: Clear all the memories and change the setting to the Asia version 34: Clear all the memories and change the setting to the Hoechst version 35: Clear all the memories and change the setting to the Regma version

Mode No.		Function	Data
–1			36: Clear all the memories and change the setting to the K+E version 37 to 40: Factory use
–2	Total Counter Unit Setting	Selects the unit in which the total counter counts up by.	0: 1 m 1: 1 yard 2: 100 inches 3: 50 inches 4: A1 length (594 mm) 5. Sheet (Any size) 6: Feet
–3	Inch/mm Exchange	Selects the unit in which the edge margin and paper length is indicated by.	0: mm 1: Inch
–4	Not Used		
–5	Registration Adjustment	Adjusts the paper registration.	**0: Standard** –9.9 ← **0** → 9.9 mm Advance Delay
–6	Hot Roller Temperature Adjustment	Change the hot roller temperature setting.	**0: Standard** –9 ← **0** → 9°C Decrease Increase
–7	Pressure Roller Temperature Adjustment	Change the pressure roller temperature setting.	**0: Standard** –9 ← **0** → 9°C Decrease Increase
–8	Hot Roller/ Pressure Roller Temperature Display	Displays the hot roller temperature and pressure roller temperature. Even if the SP mode is canceled when the temperature is displayed, the temperature is continuously displayed during stand-by condition or copy cycle. To release this condition, turn the main switch off and on.	Fu = XXX Pr = XXX Fu: Hot roller temperature Pr: Pressure roller temperature If the hot roller temperature is lower than 80°C (pressure roller temperature is lower than 50°C), "LLL" is indicated. If the hot roller temperature is higher than 220°C (pressure roller temperature is higher than 180°C), "HHH" is indicated.
–9	Toner Density Setting	Selects the toner density setting.	**0: N (Normal)** 1: L (Lighter) 2: H (Darker)

Mode No.		Function	Data
–12	Light Sensor Adjustment	Change the light sensor setting. Turn on and off the exposure lamp using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**80: Standard** 0 ← **80** → 99 Darker Lighter
–13	Drum Charge Setting	Determines the drum charge voltage. In this mode, the charge corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**205**: Standard 150 ← **205** → 249 Low High
–14	Copy Grid Setting	Determines the copy grid voltage. In this mode, the grid voltage can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**16: Standard** 0 ← **16** → 22 Low High
–15	Transfer Corona Voltage Setting-1	Determines the transfer corona voltage. In this mode, the transfer corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**100: Standard** 40 ← **100** → 180 Low High
–16	Transfer Voltage at Setting-2	Determines the transfer corona voltage at the paper trailing edge in Roll Feed mode. In this mode, the transfer corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**230**: Standard 40 ← **220** → 249 Low High
–18	Separation AC Voltage Setting-1	Determines the AC separation corona voltage. In this mode, the separation corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**180: Standard** 100 ← **180** → 249 Low High
–19	Separation DC Voltage Setting-1	Determines the DC separation corona voltage. In this mode, the separation corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**55: Standard** 0 ← **55** → 249 Low High
–20	Separation AC Voltage Setting-2	Determines the AC separation corona voltage at the paper leading edge. In this mode, the separation corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**200: Standard** 100 ← **200** → 249 Low High

Mode No.		Function	Data
–21	Separation DC Voltage Setting-2	Determines the DC separation corona voltage at the paper leading edge. In this mode, the separation corona can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**70: Standard** 0 ← **70** → 249 Low High
–22	DC Separation Voltage at Trailing Edge Setting	Determines the dc separation corona voltage at the paper trailing edge.	0: +150 V 1: +160 V 2: +170 V **3: +180 V**
–23 to –24	Not Used		
–25	Bias Voltage for the Image Area Setting	Determines the development bias voltage for the image area. In this mode, the bias voltage can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**3: Standard** 0 ← **3** → 8 Low High (1step: 20 V)
–26	Bias Voltage for Non-image Area Setting	Determines the development bias voltage for the non-image area. In this mode, the bias voltage can be turned on and off using the Leading Edge Cut key. ON: Indicator on OFF: Indicator off	**4: Standard** 0 ← **4** → 8 Low High (1 step: 20 V)
–28	Fusing Roller Speed Adjustment Mode	If this setting is changed to 1, the registration clutch is turned off when the paper is transported 45 mm past the fusing exit sensor.	**0: Clutch keeps on** 1: Clutch turns off
–29	Fusing Motor Speed Adjustment	Determines the fusing motor base speed.	30: Standard (0 ↔ 60) 10 steps increment will increase the motor speed by 0.05%.
–30	Fusing Motor Speed Correction (Bond Paper)	Determines the fusing motor speed correction value for Bond Paper setting.	–10 ← **0** → 10 1 steps increment will decrease the motor speed by 0.05%.
–31	Fusing Motor Speed Correction (translucent)	Determines the fusing motor speed correction value for translucent setting.	–10 ← **0** → 10 1 step increment will decrease the motor speed by 0.05%.

Mode No.		Function	Data
–32	Fusing Motor Speed Correction (Film)	Determines the fusing motor speed correction value for Film setting.	–10 ← **0** → 10 1 step increment will decrease the motor speed by 0.05%.
–34	Vertical Image Length Adjustment	Determines the original feed motor speed.	0 ← **20** → 40 1 step increment will increase the motor speed by 0.05%.
–35	Synchro-cut Length Auto Adjustment (297 mm)	Adjusts the original cut length in Synchro Cut mode at 297 mm (standard length). Insert the 297 mm length original five times (this number displayed on the copy number indicator can be changed : 1 to 10). If the actual original length is different from the standard length, input the following value in the cut length indicator before inserting the original: Actual Length - Standard Length Then the machine automatically calculates the correction value. The data is overwritten on SP#–38.	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–36	Synchro-cut Length Auto Adjustment (1189 mm)	Adjusts the original cut length in Synchro Cut mode at 1189 mm. Insert the 1189 mm length original five times (this number displayed on the copy number indicator can be changed : 1 to 10). If the actual original length is different from the standard length, input the following value in the cut length indicator before inserting the original: Actual Length - Standard Length Then the machine automatically calculates the correction value. The data is overwritten on SP#–39.	–50.0 ← **0** → 50 1 setp = 0.1 mm
–37	Paper Feed Motor Speed Setting	Determines the paper feed motor speed. By changing this speed, the amount of paper buckle which is necessary for cut operation will be changed.	0 ← **0** → 10 1 step increment will increase the motor speed by 0.1%.
–38	Synchro-cut Length Manual Adjustment (297 mm)	Adjusts the synchro cut length when 297 mm original is used. Increasing the number will shorten the paper cut length.	–9.9 ← **0** → 9.9 1 step = 0.1 mm (This value is over written when SP#–35 is performed.)

Mode No.		Function	Data
–39	Synchro-cut Length Manual Adjustment (1189 mm)	Adjusts the synchro cut length when 1189 mm original is used. Increasing the number will shorten the paper cut length.	–50.0 ← **0** → 50 1 setp = 0.1 mm (This value is over written when SP#–36 is performed.)
–40	Preset Cut Length Adjustment (1st roll feed, 297 mm, plain paper)	Adjusts the cutting length of 297 mm in the plain paper mode.	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–41	Preset Cut Length Adjustment (1st roll feed, 1189 mm, plain paper)	Adjusts the cutting length of 1189 mm in the plain paper mode.	–50.0 ← **0** → 50 1 setp = 0.1 mm
–42	Preset Cut Length Adjustment (1st roll feed, 297 mm, translucent paper)	Adjusts the cutting length of 297 mm in the translucent paper mode. (This adjustment affects the 297 mm cut length of the 2nd and 3rd roll feed in translucent paper mode.)	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–43	Preset Cut Length Adjustment (1st roll feed, 1189 mm, translucent paper)	Adjusts the cutting length of 1189 mm in the translucent paper mode. (This adjustment affects the 1189 mm cut length of the 2nd and 3rd feed in translucent paper mode.)	–50.0 ← **0** → 50 1 setp = 0.1 mm
–44	Preset Cut Length Adjustment (1st roll feed, 297 mm, film)	Adjusts the cutting length of 297 mm in the film mode. (This adjustment affects the 297 mm cut length of the 2nd and 3rd feed in translucent paper mode.)	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–45	Preset Cut Length Adjustment (1st roll feed, 1189 mm, film)	Adjusts the cutting length of 1189 mm in the film mode. (This adjustment affects the 1189 mm cut length of the 2nd and 3rd feed in translucent paper mode.)	–50.0 ← **0** → 50 1 setp = 0.1 mm
–46	Preset Cut Length Adjustment (2nd roll feed, 297 mm, plain paper)	Adjusts the cutting length of 297 mm in the plain paper mode.	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–47	Preset Cut Length Adjustment (2nd roll feed, 1189 mm, plain paper)	Adjusts the cutting length of 1189 mm in the plain paper mode.	–50.0 ← **0** → 50 1 setp = 0.1 mm

Mode No.		Function	Data
–48	Preset Cut Length Adjustment (3rd roll feed, 297 mm, plain paper)	Adjusts the cutting length of 297 mm in the plain paper mode.	–9.9 ← **0** → 9.9 1 step = 0.1 mm
–49	Preset Cut Length Adjustment (3rd roll feed, 1189 mm, plain paper)	Adjusts the cutting length of 1189 mm in the plain paper mode.	–50.0 ← **0** → 50.0 1 setp = 0.1 mm
–50	Original Registration Sensor Auto Adjustment	Adjusts the original registration sensor sensitivity. The registration sensor voltage is automatically adjusted to 3.0 V. During the adjustment, "Adj" is displayed.	**0: No** 1: Adjustment Start
–51	Original Registration Sensor Manual Adjustment	Manually adjusts the registration sensor output voltage when the sensor is off. When SP-50 is performed, the adjusted voltage is overwritten on this data. Normally, this value should be 3.0V.	0 ← **50** → 99 1 step = 0.05V
–52	Original Registration Sensor Voltage Display	Displays the original registration sensor voltage.	dr = X, XX
–53	Synchro-cut Length Auto Adjustment (1189 mm) -Long Narrow Original Mode	Adjusts the original cut length in Synchro Cut mode at 1189 mm in narrow and long mode. Insert the 1189 mm length original in the long narrow original mode (the green lever is pulled front) five times (this number displayed on the copy number indicator can be changed : 1 to 10). If the actual original length is different from the standard length, input the following value in the cut length indicator before inserting the original: Actual Length - Standard Length Then the machine automatically calculates the correction value. The data is overwritten on SP#–54.	–50.0 ← **0** → 50 1 setp = 0.1 mm
–54	Synchro-cut Length Manual Adjustment (1189 mm) -Long Narrow Original Mode	Adjusts the synchro cut length when 1189 mm original is used in the long narrow original mode. Increasing the number will shorten the paper cut length.	–50.0 ← **0** → 50 1 setp = 0.1 mm (This value is over written when SP#–53 is performed.)
–55	ADS Setting	Changes the image density in ADS mode.	**0: Normal** 1: Lighter 2: Darker

Mode No.		Function	Data
–56	ADS Auto Adjustment	Adjusts the ADS output voltage automatically to 3.0V with the manual density level 7 when the ADS sensor reads the white plate.	**0: No** 1: Adjustment Start
–57	ADS Manual Adjustment	Manually adjusts the ADS sensor voltage. When SP-56 is performed, the adjusted voltage is overwritten on this data. Normally, this value should be 3.0V.	0 ← **85** → 99
–58	ADS Voltage Display (Last Copy)	Displays the ADS voltage for the last copy.	Ad = X, XX
–59	ADS Voltage Display (Real Time)	Displays the real time ADS sensor output.	Ad = X, XX
–60	TD Sensor Setting	Determines the TD sensor control voltage. Higher number setting will increase the toner density higher.	**0: Standard** 1 to 10: Darker
–61	Toner Density Sensor Voltage Setting	Changes the toner density sensor voltage. Normally, the value is automatically adjusted when the new developer initialization (SP40) is done. In this mode, the development motor, main motor, QL and the bias voltage for non-image area can be turned or and off using the Roll Edge Cut.	**80: Standard** 50 ← **90** → 120 Low High
–62	Toner Sensor Voltage Display (Last Copy)	Displays the toner sensor output voltage for the last copy.	A = X,XX (Beeper)
–63	Toner Sensor Voltage Display (Real Time)	Displays the real time toner sensor output voltage. In this mode, the PTL, main motor, QL and the bias voltage for non-image areas can be turned on and off using the Copy Media key. Translucent paper = ON Translucent Film = OFF Even if the SP mode is canceled when the voltage is displayed, the voltage is displayed during the stand-by condition or copy cycling (the toner sensor output voltage, paper length and copy counter are displayed one after the other). To release this condition, turn the main switch off and on.	A = X,XX A = Toner Sensor Voltage During the stand-by condition, and copy cycling the following data is displayed. A = X,XX ↓ LE = X,XXX ↓ CO = XX ↓ (Beeper) LE = Paper Length (ex. 297 mm: LE = 0.297 12 inch: LE = 0.120) CO = Copy counter

Mode No.		Function	Data
–64	Q/M Correction Counter	Displays the number of copies made after the new developer initialization is done. This value can be re input using +,- keys.	0 → 250
–65	Toner Supply Mode Selection	Selects the toner supply mode. Normally, detect supply mode (setting 0) should be used. If 1, 2, or 3 is selected and the main switch is turned off and on, the wrench mark blinks and the machine goes to fixed supply mode.	**0: Detect Supply mode** 1: Fixed Supply mode (7.5%) 2: Fixed Supply mode (15%) 3: Fixed Supply mode (30%)
–66	Charge Wire Cleaner Motor Overcurrent Detection Voltage Setting	Determines the charge wire cleaner motor over current detection voltage.	1.0 ← **1.5** → 2.0 1 step = 0.1 V
–70	Hot Roller Idling Time Setting	Determines the hot roller idling time after the fusing temperature reaches the ready condition. Even if the selected time has not past, the fusing motor stops when the pressure roller temperature reaches 130°C.	0: No idling 1: 30 seconds **2: 1 minute** 3: 2 minutes 4: 3 minutes
–71	Pressure Roller Temperature Correction Start Time Setting	Determines the pressure roller temperature correction start time.	**0: 30 seconds after the hot roller stops rotation.** 1: 20 seconds after the hot roller stops rotation. 2: 10 seconds after the hot roller stops rotation. 3: Soon after the hot roller stops rotation.
–72	Pressure Roller Temperature Correction Value Setting 1 (Normal Temperature Mode)	Determines the pressure roller temperature correction value after the hot roller stops rotation. The setting of this SP mode is added to the standard correction value.	-4: -20°C -3: -15°C -2: -10°C -1: -5°C **0: 0** 1: +5°C 2: +10°C 3: +15°C 4: +20°C

Mode No.		Function	Data
–73	Pressure Roller Temperature Correction Value Setting 2 (Normal Temperature Mode)	Determines the pressure roller temperature correction value during the hot roller rotation. The setting of this SP mode is added to the standard correction value.	-4: -20°C -3: -15°C -2: -10°C -1: -5°C 0: 0 1: +5°C 2: +10°C 3: +15°C 4: +20°C
–74	Pressure Roller Temperature Correction Value Setting (High Temperature Mode)	Determines the pressure roller temperature correction value while the hot roller is not in rotation in high temperature mode.	**0: 0** 1: +10°C **2: +15°C** 3: +20°C 4: +25°C 5: +30°C
–76	Fusing Extra Waiting Time Recovery Temperature Setting	Determines the recovery temperature of the pressure roller from the fusing extra waiting time.	0: 130°C **1: 133°C**
–77	Temperature Selection Recovery Setting	Determines the condition when the machine becomes "Ready" condition after the fusing temperature setting is changed.	**0: Soon after the setting is changed (if the fusing is within the temperature ready area)** 1: When the temperature reaches target temperature
–78	Paper Feed Waiting Time in copy speed reduction mode	Selects paper feed waiting time in copy speed reduction mode (if "3" is selected in SP#61).	5: Standard 1~20: 1 second/step
–80	Forced Ready Condition (Factory Use)	Goes to "Ready" condition ignoring the fusing temperature. This mode cannot be used during the development idling.	**0: Normal** 1: Forced Ready Condition
–81	Lamp Off Mode	Fluorescent lamp does not turn on during the copy cycle.	**0: Normal** 1: Lamp off

Mode No.		Function	Data
–82	Misfeed Detection Cancel Mode	Ignores jam detections selected.	**0: Normal** 1: Paper Feed Jam (C) 2: Paper Feed Jam (B) 3: Paper Feed Jam (C) and (B) 4: Original Jam (A) 5: Original Jam (A) and (C) 6: Original Jam (A) and (B) 7: All Misfeed Detections
–83	Free Run Mode	The machine caries out copy operation without an original and copy paper. The machine starts operation when the original see sensor is actuated for 2 seconds, and stops when the Emergency Stop key is pressed.	**0: Normal** 1: Next Paper is fed at the time when the Set Original indicator lights. 2~250: Next paper is fed X seconds after the time when the Set Original indicator lights. X = Input Number
–85	Toner Full Supply Mode	In the Special Toner Supply mode (SP62), if the "clear/stop" key is pressed while the "Emergency Stop" key is pressed, 100%, toner supply is done.	**0: No** 1: Toner Full Supply Mode
–86	Charge Wire Cleaner Special Mode	Starts charge wire cleaning if Emergency Stop key is held down for three seconds in stand-by condition.	**0: No** 1: Yes
–87	Disable Charge Wire Cleaning Operation	Disables the charge wire cleaning operation.	**0: Normal** 1: Wire cleaning is disabled
–88	Misfeed Special Recovery Mode	1. While the Edge Margin key is held down, the original feed motor and the original gate solenoid turns on. 2. While the Enter key is held down, main motor, development motor, fusing motor, PTL, bias for no image area, and registration clutch are energized.	**0: Normal** 1: Misfeed special recovery mode.
–89	Factory Use Only		

Mode No.		Function	Data
–90	Minimum Paper Length Setting	Specifies the minimum paper length.	(In mm mode) **0: 245 mm** 1: 210 (In inch mode) **0: 9.6 inch** 1: 8.5 inch
–91	Factory Use Only		
–92	Synchro-cut Rear Feed Mode	Normally, an original cannot be inserted from the rear side in Synchro-cut mode. If 1 is selected in this mode, an original can be inserted from the rear side even if Synchro-cut mode is selected. This mode cannot be used with the trailing edge margin function. In this mode, the copy will be 194 mm longer than the original.	0: Normal 1: Synchro-cut Rear Feed Mode
–93	Factory Use Only		
–94	Original Hold Position Setting	Selects the position that the original will be stopped and caught by the original exit roller when "1" or "2" is selected in SP#24.	0: Normal (Original exit roller) 1: 45 mm before the original exit roller
–95 –96 –97	Factory Use Only		

Paper Size Pattern Data (SP No. 28)

SP28 Setting	Preset Size Pattern
In mm Mode	
0	3600, 1189, 841, 594, 420, 297
1	3600, 3000, 2500, 2000, 1500, 1189, 841, 594, 420, 297
2	3600, 1456, 1030, 728, 515, 364, 257
3	3600, 3000, 2500, 2000, 1456, 1030, 728, 515, 364, 257
4	3600, 1456, 1189, 1030, 841, 728, 594, 515, 420, 364, 297, 257
5	3600, 3000, 2500, 2000, 1456, 1189, 1030, 841, 728, 594, 515, 420, 364, 297, 257
6	The data stored in SP29 to 38
In Inch Mode	
0	142.0, 48.0, 36.0, 24.0, 18.0, 12.0
1	142.0, 128.0, 96.0, 72.0, 64.0, 48.0, 36.0, 24.0, 18.0, 12.0
2	142.0, 44.0, 34.0, 22.0, 17.0, 11.0
3	142.0, 128.0, 96.0, 72.0, 64.0, 44.0, 34.0, 22.0, 17.0, 11.0
4	142.0, 48.0, 44.0, 36.0, 34.0, 24.0, 22.0, 18.0, 17.0, 12.0, 11.0
5	142.0, 128.0, 96.0, 72.0, 64.0, 48.0, 44.0, 36.0, 34.0, 24.0, 22.0, 18.0, 17.0, 12.0, 11.0
6	The data stored in SP29 to 38

Default Settings for Each Destination (SP #–1)

SP. No.	Japan	U.S.A.	Europe	Asia	Hoechst	Regma	K + E
#1	4	12	10	10	10	10	12
#2	1	2	1	1	1	1	2
#3	1	1	1	1	1	1	1
#4	0	0	0	0	0	1	0
#14	0	0	0	0	0	0	0
#16	0	0	0	0	0	0	0
#19	—	30	—	—	—	—	30
#26	0	1	2	2	2	2	1
#27	0	0	0	0	0	0	0
#28	0	0	0	0	0	0	0
#–2	0	6	0	0	0	0	6
#–3	0	1	0	0	0	0	1

3.2 INPUT/OUTPUT CHECK MODE

The input check mode allows you to check the current status of electrical components (such as sensors, switches, etc.) from the operation panel.

The output check mode allows you to turn the individual electrical components (such as motors, solenoids, etc.) ON/OFF from the operation panel.

3.2.1 INPUT/OUTPUT CHECK MODE ACCESS PROCEDURE

How to access the output check mode

Press the following keys in sequence.

The second time that the"Clear Stop" key is pressed, hold it down for more than 3 seconds (until the and indicators blink).

How to leave the input/output check mode

Press the following keys in sequence.

or turn off the main switch.

NOTE: Each of the above procedures must be finished within 20 seconds.

How to select the program number

The program number can be selected by pressing the "+" and "–" keys.

To select an input check mode, press the "–" key.

To select an output check mode, press the "+" key.

The selected number is displayed on the lead edge erase indicator (the two digit indicator beside the mark).

To select the program number quickly, hold down the "+" or "–" key.

Service Tables

3.2.2 INPUT CHECK MODE TABLE

The on/off status of the selected electrical component is displayed on the paper length indicator ("ON" or "OFF" is displayed.). If a program number not used is selected, "NOT" is displayed.

Program No.	Electrical Component	Note
-1	Original Set Sensor	
-2	Original Lead Edge Sensor	
-3	Original Registration Sensor	
-4	Original Exit Sensor 1	
-5	Original Switch Back Sensor	
-6	Rear Original Set Sensor	
-7	Paper Set Sensor	
-8	Registration Sensor	
-9	Fusing Exit Sensor	
-10	Roll Lead edge Sensor	
-11	Roll End Sensor 1	"ON" is displayed in a roll end condition.
-12	Roll End Sensor 2	"ON" is displayed in a roll end condition.
-13	Roll End Sensor 3	"ON" is displayed in a roll end condition.
-14	Not Used	
-15	Main Motor Lock Signal	"ON" is displayed when the main motor rotates properly.
-16	Development Roller Lock Signal	"ON" is displayed when the development motor rotates properly.
-17	Wire Cleaner Motor Overcurrent Detection Signal	"ON" is displayed when the wire cleaner motor overcurrent is detected.
-18	Not Used	
-19	Exit Cover Open Switch	ON" is displayed when the exit cover is open.
-20	Upper Unit Open Sensor	
-21	Original Feed Unit Open Sensor	
-22	Paper Feed Unit Open Sensor	
-23	3rd Roll Feed Door Open Switch	"ON" is displayed when the 3rd roll door is opened.
-24	Not Used	
-25	Right Cutter Switch	
-26	Left Cutter Switch	
-27	Not Used	
-28	Original Mode Change Sensor	"ON" is displayed in the long narrow original feed mode.
-29	Not Used	
-30	Toner Overflow Sensor	"ON" is displayed when the sensor is activated.
-31	Total Counter Feed Back Signal	"ON" is displayed when the main PCB receives the feed back signal from the key counter or the total counter terminal is open.

Program No.	Electrical Component	Note
-32	Key Counter Set Signal	"ON" is displayed when the key counter is not set.
-33	Not Used	
-34	Not Used	
-35	Original Exit Sensor 2	
-36	Original Exit Sensor 3	
-37	Emergency Stop Key	"ON" is displayed when the Emergency Stop key is pressed.

OUTPUT CHECK MODE

Press the "#" key to turn on the selected electrical component. The status of the component is displayed on the paper length indicator.

To turn off the component, press the "#" key again.

Program No.	Electrical Component	Note
1	Main Motor	
2	Development Motor	
3	Pick-off Pawl Solenoid	
4	Exit Gate Solenoid	
5	Registration Clutch	
6	Fusing Lamp	The light intensity depends on the manual ID setting.
7	Anti-humidity Heater	The heater turns off when the relay is activated.
8	Anticondensation Heater Relay	The heater turns off when the relay is activated.
9	Not Used	
10	QL	
11	PTL	
12	Fluorescent Lamp	
13	Main Charge Corona	
14	Grid Voltage	
15	Transfer Corona for Bond Paper	
16	Transfer Corona for Translucent Paper Leading Edge	
17	Transfer Corona for Film	
18	Separation Corona for Bond Paper	
19	Not Used	
20	Separation Corona	
21	Not Used	
22	Separation Corona for Film	
23	Not Used	
24	Not Used	
25	Development Bias for Image Area	

Program No.	Electrical Component	Note
26	Development Bias for Non-image Area	
27	Main Charge Corona + Grid Voltage	
28	Main Motor + Development Motor + PTL + QL + Development Bias for Non-image Area	
29	Not Used	
30	Fusing Motor	
31	Vacuum Motors	
32	Exhaust Fan	
33	Not Used	
34	Original Feed Motor (forwarding and reversing)	The original feed motor turns forward and reverse by turning on and off the motor.
35	Original Feed Motor Drive Direction	Determines the original feed motor rotation when output No. 36 is used. ON: Reverse OFF: Forward
36	Original Feed Motor	The direction of rotation is determined by No. 35.
37	Original Gate Solenoid	
38	ADS Sensor Lamp	
39	ADS Reset	
40	Roll Feed Motor Drive Direction	Determines the roll feed motor rotation when output No. 41 is used. ON: Reverse OFF: Forward
41	Paper Feed Motor	The direction of rotation is determined by No. 40.
42	Roll Feed Clutch 1	
43	Roll Feed Clutch 2	
44	Roll Feed Clutch 3	
45	Cutter Motor	Depending on the setting of No. 58, the number of times the motor operates or the cutter motor on time, is displayed.
46	Not Used	
47	Wire Cleaner Motor (Forward)	
48	Wire Cleaner Motor (Reverse)	
49	Not Used	
50	Total Counter	
51	Not Used	
52	Main Switch OFF (Energy Star)	Turns off the main switch.
53	Not Used	
54	Not Used	
55	Key Counter	
56	Not Used	
57	Not Used	

Program No.	Electrical Component	Note
58	Motor Operation Number/Time Display	Determines which is displayed when the cutter motor (No. 45) or the wire cleaner motor (No. 59) is activated. ON: Total time of the motor operation OFF: Total number of times the motor operates.
59	Wire Cleaner Motor	Depending on the setting of No. 58, the number of times the cutter mechanism is engaged or the cutter motor on time, is displayed.

3.3 POWER ON INITIAL SETTING MODE

The initial setting, when the main switch is tuned on, can be changed in this mode. The procedure is as follows:

1. Turn on the main switch while holding the Emergency stop key down and indicators blink).
2. Input the operation panel setting that the customer requires (paper size, image density, etc.).
3. Turn off the main switch.

The setting, just before the main switch is turned off, is memorized as the power on initial setting. It appears again when the main switch is turned on.

4. JAM CODE LIST

When a document (original) jam or paper jam occurs, the cause of the jam is displayed by using the following jam code.

4.1 ACCESS PROCEDURE

1. When a document jam or paper jam occurs, press and hold the Clear/Stop key.
2. Read the jam code.

4.2 JAM CODE TABLE

Jam Code	Jam Detection Condition
dJ01	Initial Jam (Original Set Sensor)
dJ02	Initial Jam (Original Leading Edge Sensor)
dJ03	Initial Jam (Original Registration Sensor)
dJ04	Initial Jam (Original Exit Sensor)
dJ05	Initial Jam (Original Repeat Sensor)
dJ06	Initial Jam (Rear Entrance Sensor)
PJ07	Initial Jam at Power ON (Paper Entrance Sensor)
PJ08	Initial Jam (Paper Registration Sensor)
PJ09	Initial Jam (Fusing Exit Sensor)
PJ10	Initial Jam (Roll Leading Edge Sensor)
dJ15	Displayed after the Emergence Stop key is pressed.
dJ20	The original set sensor and the rear original set sensor are ON at the same time.
dJ21	The original leading edge sensor does not turn on within 10 seconds after the original transport motor starts rotation.
dJ22	Original is pulled out after the original registration sensor is turned on.
dJ23	Original is too long.
dJ24	The rear original set sensor turns on after the original is inserted from the front side. (The original set sensor turns on after the original is inserted from the rear side.)
dJ25	When the original transportation is reversed, the original exit sensor 3 keeps on for more than 1 second.
dJ26	The set sensor or the rear original set sensor is activated before the Set Original indicator turns on.
dJ30	Original registration sensor OFF check at original leading edge (when the original is forwarded)
dJ31	Original registration sensor ON check at original leading edge (when the original is forwarded)
dJ32	Original exit sensor OFF check at original leading edge (when the original is forwarded)
dJ33	Original exit sensor ON check at original leading edge (when the original is forwarded)

dJ40	Original leading edge sensor OFF check at original trailing edge (when the original is forwarded)
dJ41	Original leading edge sensor ON check at original trailing edge (when the original is forwarded)
dJ42	Original Exit sensor OFF check at original trailing edge (when the original is forwarded)
dJ43	Original Repeat sensor OFF check at original trailing edge (when the original is forwarded)
dJ50	Original registration sensor OFF check at original leading edge (when the original transportation is reversed)
dJ51	Original registration sensor ON check at original leading edge (when the original transportation is reversed)
dJ52	Original leading edge sensor OFF check at original leading edge (when the original transportation is reversed)
dJ53	Original leading edge sensor ON check at original leading edge (when the original transportation is reversed)
dJ54	Original repeat sensor OFF check at original leading edge (when the original transportation is reversed)
dJ55	Original repeat sensor ON check at original leading edge (when the original transportation is reversed)
dJ56	Original exit sensor OFF check at original trailing edge (when the original transportation is reversed)
dJ57	Original registration sensor OFF check at original trailing edge (when the original transportation is reversed)
dJ58	Original registration sensor ON check at original leading edge (when the original transportation is reversed)
PJ60	Roll leading edge sensor OFF check at paper leading edge
PJ61	Roll leading edge sensor ON check at paper leading edge
PJ62	Roll leading edge sensor OFF check at paper trailing edge
PJ63	Both of the left and right cutter sensors do not turn on after the roll cut operation starts.
PJ64	Roll leading edge sensor turned off during the roll paper feeding.
PJ70	Registration sensor OFF check at paper leading edge
PJ71	Registration sensor ON check at paper leading edge
PJ72	Registration sensor OFF check at paper trailing edge
PJ73	Registration sensor OFF check at paper leading edge (Small size is selected, and roll has already been cut.)
PJ80	Fusing exit sensor OFF check at paper leading edge
PJ81	Fusing exit sensor ON check at paper leading edge
PJ82	Fusing exit sensor OFF check at paper trailing edge
PJ90	Paper is pulled out after the registration sensor turns on.
PJ91	The registration sensor does not turn on within 10 seconds after the main motor starts rotation.
PJ92	Original is not set within the determined time after the paper set sensor turns on.
PJ93	Paper set sensor turns on during the roll feeding.
PJ94	Paper is too long.

5. SPECIAL TOOLS AND LUBRICANTS

No.	DESCRIPTION	PART NO.	REMARKS
1	Digital Multimeter	54209507	BECKMAN RMS3030
2	Deluxe Test Lead Accessory Kit	54209508	BECKMAN DL241
3	Grease – Mobil Temp.78	54479078	400 g/can
4	Grease-G501	52039501	
5	Current Measuring Drum	A0239520	
6	Test Chart OS-A1 (2 sheets/set)	A0239504	
7	Spring Hook	A1639504 A1639505	
8	Setting Powder	54429101	

6. SERVICE REMARKS

6.1 DRUM UNIT

6.1.1 Drum

The organic photoconductor drum is comparatively more sensitive to light and ammonia gas than a selenium drum.

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe with a dry cloth or clean with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when inserting or pulling the drum unit out of the copier to avoid exposing it to bright light or direct sunlight. This will protect the drum from light fatigue.
9. Before removing the drum, place a sheet of paper under the drum to catch any falling toner.
10. Dispose of used drums according to local regulations.
11. Perform the light sensor adjustment when a new drum is installed.
12. Hold both ends of the drum unit to carry it.
13. Be careful not to scratch the drum with the pick-off pawls when removing or reinstalling the drum.
14. When installing and/or removing the pick-off pawl unit, do not press too strongly. Otherwise, the drum unit may deform.

15. When the drum unit is removed from the copier, do not close the paper path section if possible. Otherwise, the gas springs at both sides open the paper path section forcibly if the paper path section is released. If you close the paper path section, take care not to injure yourself by opening the paper path section. Also, releasing only one side of the paper path section deform the copier machine, which may cause paper jam and copy image problem. Release both levers together while holding the paper path section to open the paper path section slowly.
16. The drum unit is heavy. Take care not to injure yourself by dropping the drum unit when removing and installing it.

6.2 CHARGE CORONA

1. The wire can also be cleaned with a blower brush. If the wire is cleaned with a dry cloth, make sure that the wire does not become stretched. Do not use sand paper or a solvent.
2. Do not touch the corona wire and the grid wires with oily hands. Oil stains may cause uneven image density on copies.
3. Make sure that the corona wire is correctly positioned and that there is no foreign material (iron filings, etc.) on the casing.
4. Clean the grid wires with a dry cloth.
5. When reinstalling the charge corona unit, make sure that the 2 connectors (C for the charge corona, G for the grid bias) are set properly.
6. Make sure that the grid wires are correctly placed on the eight slots, are all straight, and not crossed.
7. Do not expand and bend the corona wires and grid wires.
8. Make sure that the wire junction is positioned inside the right endblock.

6.3 OPTICS

1. Clean the exposure glass with water or alcohol.
2. Clean the fiber optics array with lens paper or silicone cloth.
3. Make sure that the exposure glass is under the rear original guide plate when reassembling.
4. Make sure that the direction of the aperture of the exposure lamp is towards the fiber optics array side (rear side) when reassembling.

6.4 DEVELOPMENT

1. Be careful not to nick or scratch the development roller.
2. Clean the drive gears after removing used developer.
3. Initial conditioning (SP#40) is necessary when the developer is replaced.
4. Dispose of used developer according to local regulations.
5. Do not loosen the painted screws which determine the development doctor blade height and do not push the doctor blade too strongly, otherwise the doctor gap may change.
6. Be careful not to bend the bias terminal.
7. When the development unit is removed from the copier, do not close the paper path section if possible. Otherwise, the gas springs at both sides open the paper path section forcibly if the paper path section is released. If you close the paper path section, take care not to injure yourself by opening the paper path section. Also, releasing only one side of the paper path section deform the copier machine, which may cause paper jam and copy image problem. Release both levers together while holding the paper path section to open the paper path section slowly.
8. The development unit is heavy. Take care not to injure yourself by dropping the development unit when removing and installing it.
9. During the developer initialization, do not turn off the main switch, or do not open the original feed unit or the paper path section, or do not unplug the copier power cord. If these conditions happen, do the developer initialization again, the toner density sensor cannot be adjusted.
10. Keep the development unit connector at least 30 mm away from the development unit when the unit is cleaned using a vacuum cleaner.
11. Do not touch the pins of the development unit connector when the development unit is carried away from the main frame or cleaned.

6.5 TRANSFER AND SEPARATION

1. Clean the corona wires with a blower brush. If the wires are cleaned with a dry cloth, make sure that the wire does not become stretched.
2. When adjusting the corona current, always use the drum current measuring drum.
3. Make sure that the T & S corona unit is set correctly by pressing it down when reinstalling.
4. Handle the new wire by the ends only. Oil from your hands may cause uneven charge on the drum.
5. Do not expand and bend the corona wires.
6. Do not rub the corona wires with rough material (sand paper,... etc.) as this will damage the corona wire.
7. Do not use any solvent to clean the wire as this will cause uneven charge on the drum.

6.6 CLEANING UNIT

1. Be careful not to damage the edge of the cleaning blade.
2. Dispose of used toner according to local regulations.
3. Do not press the cleaning blade too strongly. Otherwise, the drum unit may deform.
4. When installing or replacing the cleaning blade, release the pressure several times manually, and then hold down the cleaning blade gently along its entire length ensure that the cleaning blade contacts the drum. Otherwise, cleaning failure may occur.
5. When replacing the cleaning blade, apply setting powder on the edge of the cleaning blade.

6.7 FUSING UNIT

1. Be careful not to damage the edges of the hot roller strippers and tension springs.
2. Do not touch the fusing lamp with bare hands.
3. Make sure that the fusing lamp does not touch the hot roller.
4. Be careful not to damage the hot roller thermistor and pressure roller thermistor when removing and reinstalling hot roller or the pressure roller.
5. The fusing unit is heavy. Take care not to injure yourself by dropping the fusing unit when removing and installing it.

6.8 ORIGINAL FEED

1. Do not touch the original feed rollers, original registration rollers, platen roller and press rollers with bare hands.
2. Clean the white plate with water or alcohol.

6.9 PAPER FEED

1. Do not touch the manual feed rollers and registration rollers with bare hands.
2. A worn out registration roller causes paper to crease. It should be replaced.

6.10 OTHERS

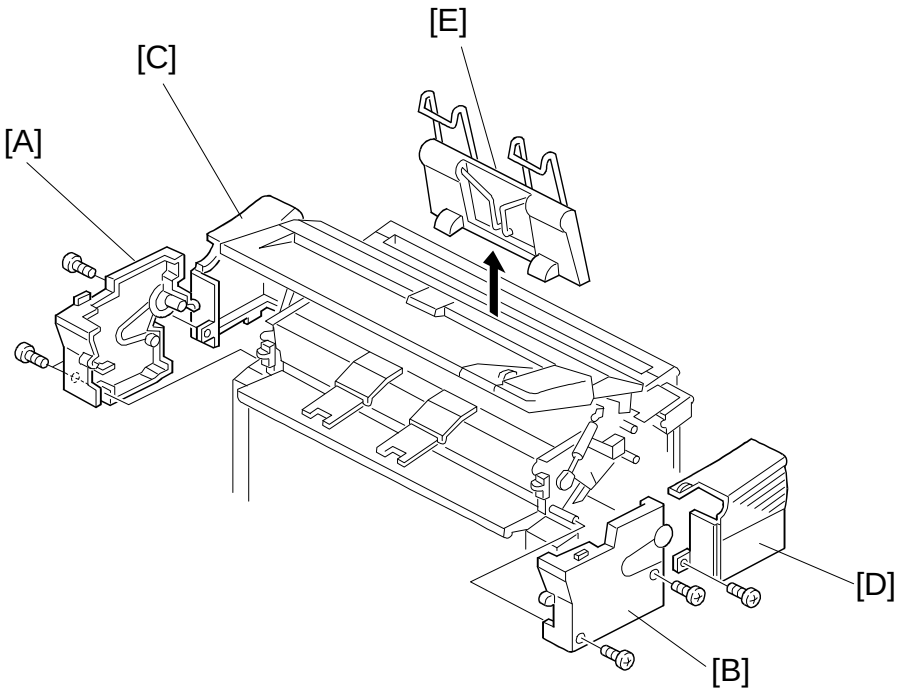
1. When replacing the main board, if the RAM on the old main board is still usable, remove and place it on the new main board. Then, install the new main board in the copier.
2. After installing the new main board with a new RAM, clear the RAM memory. (Do not clear RAM memory if you have placed the old RAM on the new main board.)
3. Take care not to damage the mylars on the rear feed table during servicing.
4. When replacing a sensor, do not overtighten the screws. This may damage the sensor.

SECTION 5

REPLACEMENT AND ADJUSTMENT

1. OPTICS

1.1 ORIGINAL FEED UNIT REMOVAL (preparation of the optics parts replacement).



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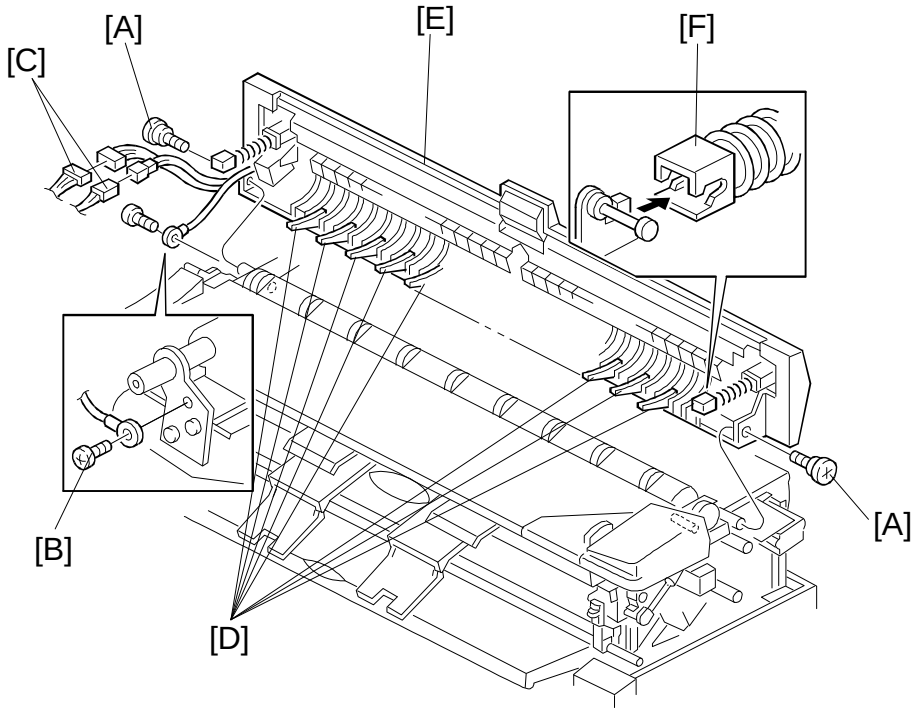
1. Remove the left upper front [A] and right upper front [B] covers (2 screws each) and left upper rear [C] and right upper rear [D] covers (1 screw each).
2. Remove the copy tray (E).



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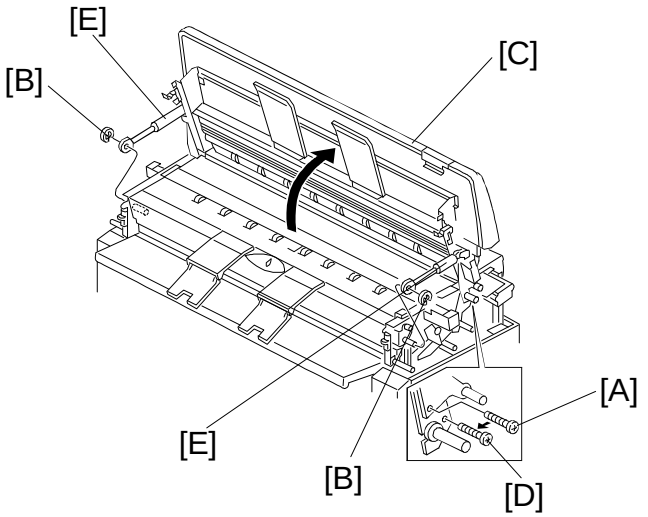
3. Remove 2 screws [A], 1 ground wire screw [B] and 2 connectors [C] of the rear feed table assembly.

   NOTE: Be careful not to dislodge the gate pawls [D]. If the pawls are dislodged, make sure that the pawl positions are aligned into the hole on the copier. Then, reinstall the pawls. Please note that there is one sensor hole in the middle of the copier. This hole is not used for the pawl.

4. Open the rear feed table assembly [E], unhook the stoppers [F] at both ends, and remove.



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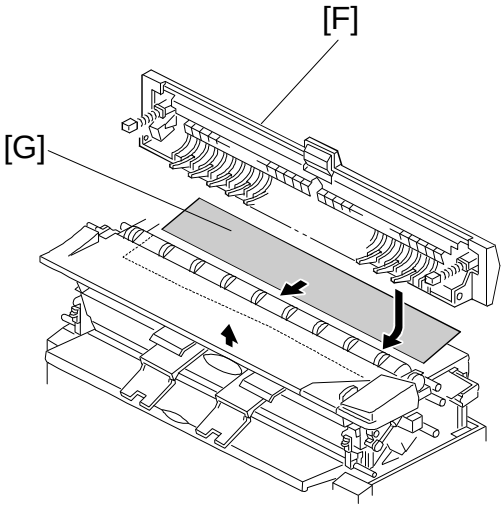

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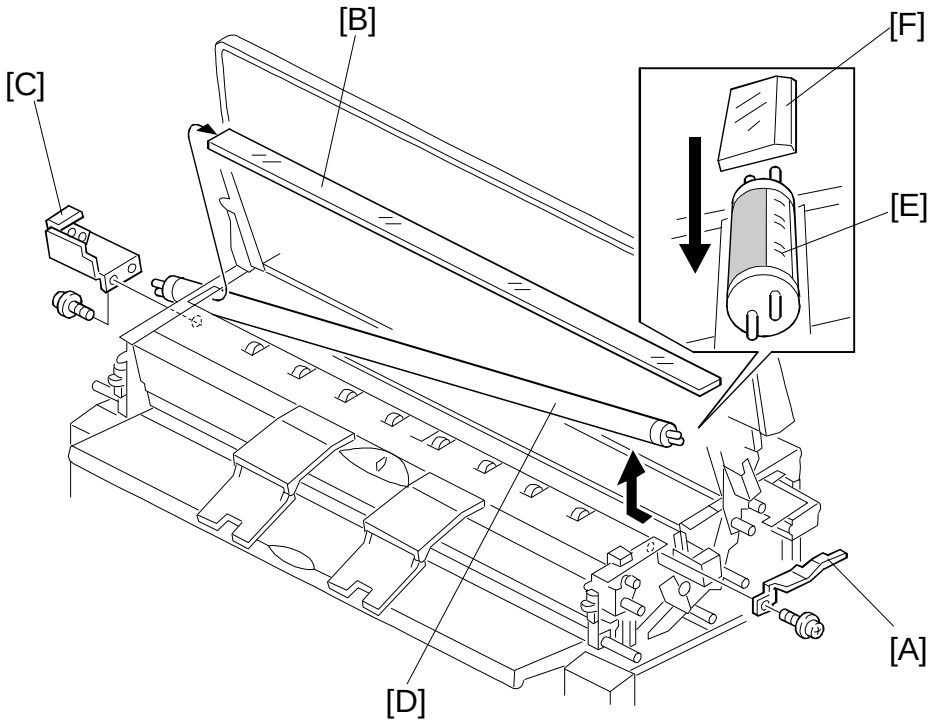
⚠ CAUTION

For the next step, do not remove the retaining rings [B] while the original feed unit [C] being closed. Otherwise, the compressed gas spring may injure you.

5. Remove the stopper screws [A] both ends.
6. Open the original feed unit [C] and remove the retaining rings [B] at both ends.
7. Turn the original feed unit and install the stopper screws [D].

NOTE: 1) Be careful not to hit the gas springs [E] to the exposure lamp and other parts nearby.
2) When reassembling the rear feed assembly [F], place a sheet of paper [G] on the original path to prevent the gate pawls from being dislodged.

1.2 EXPOSURE LAMP REMOVAL



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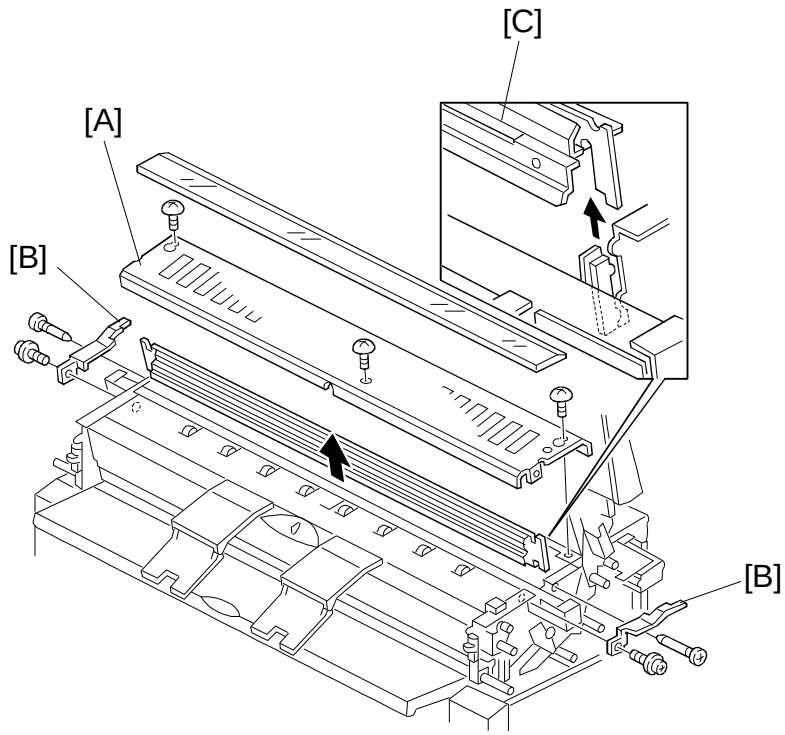
1. Stand the original feed unit.
2. Remove the spring plate [A] (1 screw, either right or left) and exposure glass [B].
3. Remove the left exposure lamp bracket [C] (1 screw) and exposure lamp [D].

NOTE: 1) Make sure that the direction of the aperture [E] of the exposure lamp is towards the fiber optics array side (rear side) when reinstalling.

2) Make sure that the direction of the cut edge [F] of the exposure glass is towards the fiber optics array side (rear side) when reinstalling.

1.3 FIBER OPTICS ARRAY REMOVAL



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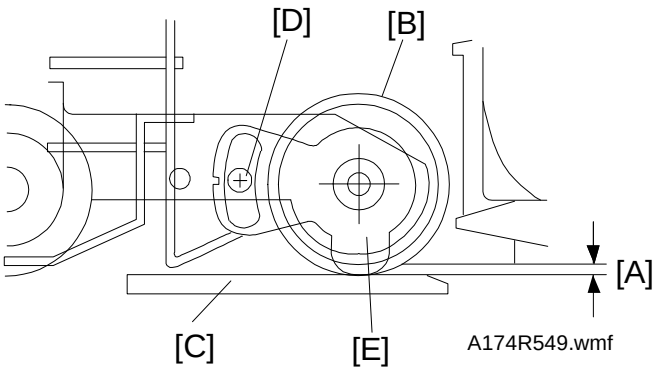
1. Remove the exposure glass. (Follow the steps from 1 to 2 of the exposure lamp removal.)
2. Remove the rear original guide plate [A] (5 screws).
3. Remove the right and left spring plates [B] (1 screw each).
4. Lift up the fiber optics array [C] and remove.

1.4 PLATEN ROLLER GAP ADJUSTMENT



Adjustment standard: 0.2~0.8 mm

1. Measure the gap [A] between the platen roller [B] and the exposure glass [C].
   If the gap is not within specification, adjust the gap by loosening the screw [D] and changing the position of the adjusting plate [E].

1.5 SYNCHRO-CUT LENGTH ADJUSTMENT

This adjustment should be carried out when the original lead edge sensor is replaced.

1. Measure the actual length of A3 (297) and A0 (1189) originals.
2. Access SP#-35 (synchro-cut length auto adjustment, 297 mm) and input the difference between the measured length and 297 mm.
3. Press the "#" key. The copy quantity indicator blinks. Input the test copy number (default:5).
4. Press the "#" key.
5. Place the measured original (A3) on the original feed table. If the original is not placed correctly (placed diagonally), by pressing the Clear/Stop key once, this step can be canceled only one time. Otherwise, carry out this procedure from the beginning.
7. Repeat step 5 until the number in the blinking copy quantity indicator is "0"
8. Press the "#"key.
9. Access SP#-36 (synchro-cut length auto adjustment, 1189 mm) and carry out the adjustment in the same way as for the 297 mm adjustment.

1.6 PRESET CUT LENGTH ADJUSTMENT

The cut length adjustment should be done when the roll feeder is installed to correct cutting errors. The cut error correction data is determined in the factory without the copier installed. The cut length varies depending on the copier on which it is installed and/or paper type used. If required, adjust the cut length as follows:

NOTE: The cut length should be measured 10 minutes or later after copying because the fusing unit dries the paper and reduces its length temporarily.

Adjustment standards: ±3 mm (for length shorter than 420 mm) ±5 mm (for 420 to 1189 mm)

There are three settings of the cut length of each roll feed station for plain paper.

[1st roll feed, 300 mm (SP#–40), 1200 mm (SP#–41);
2nd roll feed, 300 mm (SP#–46), 1200 mm (SP#–47);
3rd roll feed, 300 mm (SP#–48), 1200 (SP#–49)]

Regarding the translucent paper and film, adjusting cut length for the 1st roll feed for translucent paper or film, adjust the 2nd and 3rd roll feed cut length using the cut length adjustment of the 1st, 2nd, and 3rd plain paper roll feeds. [SP#–42 ~ –45].

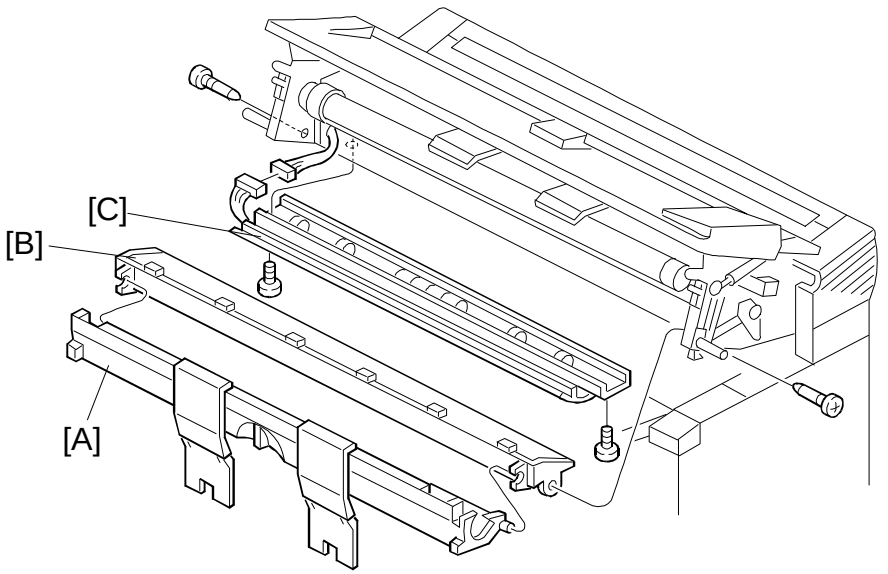
1. Make 5 copy samples of A0 lengthwise (1189) and A3 sideways (297) in the preset cut mode.
2. Measure the difference of the length between the each copy sample and preset cut length (1189 and 297). Then, calculate the average difference.
3. Input the average value using SP modes #–40 to –49 so that the cut length is within the adjustment standards.

Example:
1. Current SP data #–40 0
   Copy sample length –297 = –4
   Set SP mode #–40 .....–4
2. Current SP data #–40 0
   Copy sample length –297 = +4
   Set SP mode #–40 .....+4.0

4. Make A0 lengthwise and A3 sideways copies using preset cut mode and check their length.
5. Repeat steps 2 to 4 if necessary.

2. DEVELOPMENT

2.1 DEVELOPMENT UNIT REMOVAL



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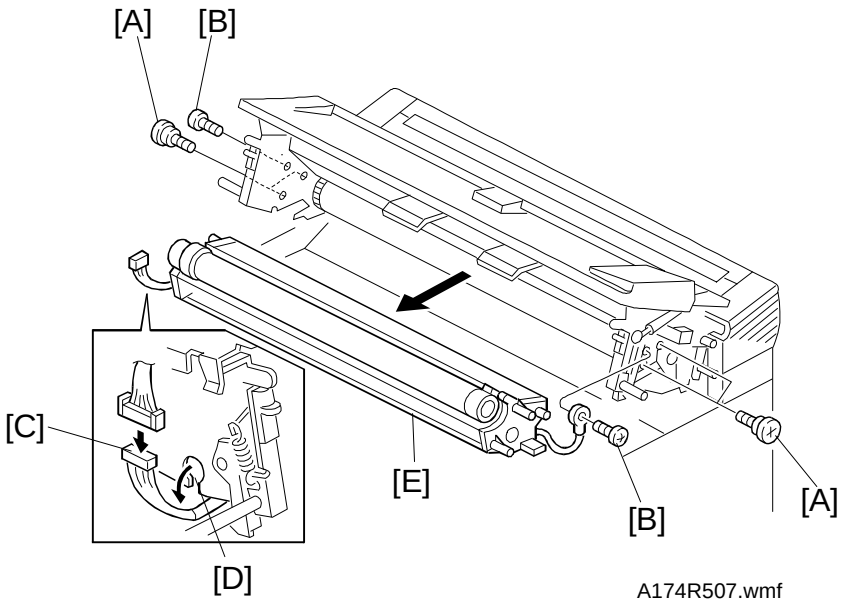
1. Remove the left and right upper front cover.
2. Open the paper path section and original feed unit.
3. Remove the toner supply cover [A].
4. Remove the manual entrance feed cover [B] (2 pins).
5. Remove the paper feed driven unit [C] (2 screws and 1 connector).



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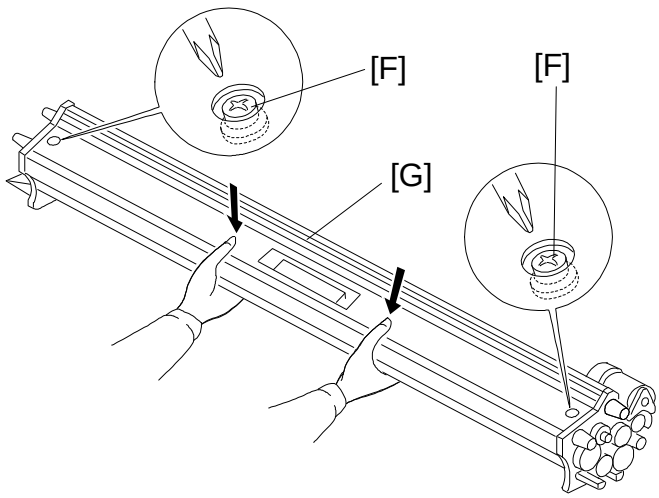

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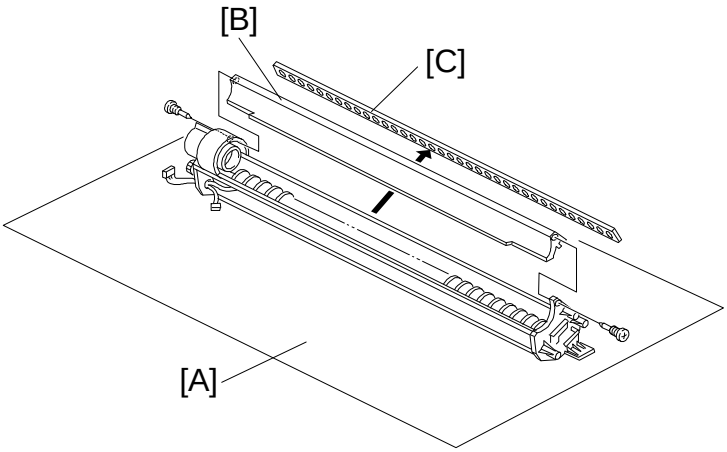
6. Remove the 4 shoulder screws [A] and 2 screws [B] fixing the development unit.
7. Disconnect the 14p connector [C] and remove it out of the cutout [D].
8. Remove the development unit [E].

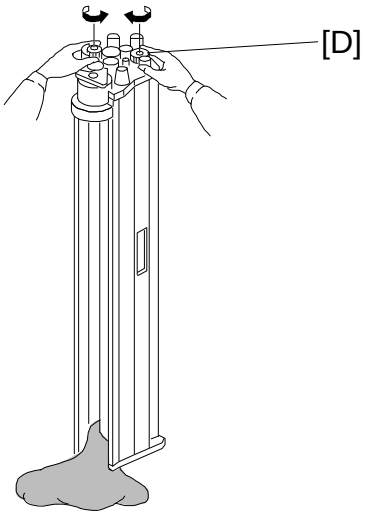
⚠ CAUTION

Do not loosen the painted screws [F] which determine the development doctor blade height and do not push the doctor blade [G] too strongly, otherwise the doctor gap may change.

2.2 DEVELOPER REMOVAL



A174R508.wmf



A174R509.wmf

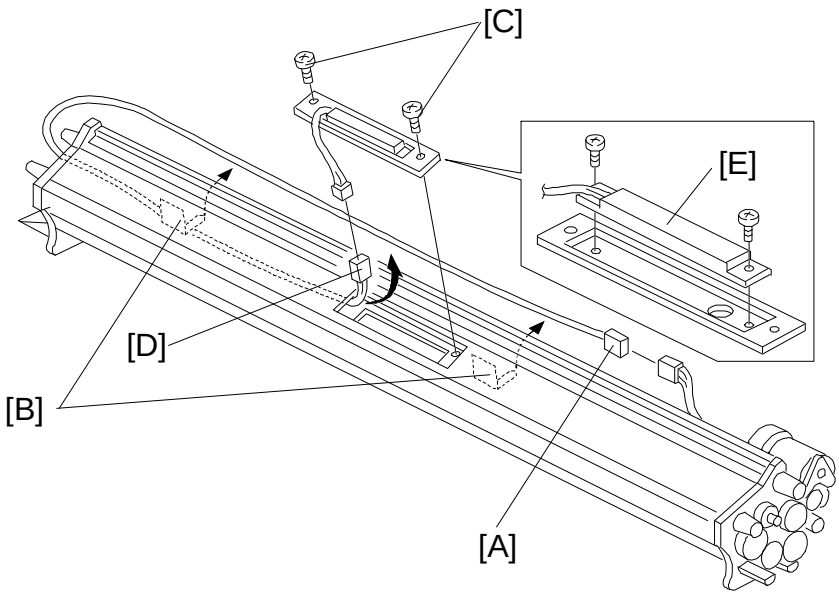
NOTE: Be careful not to bend the bias terminal.

1. Remove the development unit and place it on a large sheet of paper [A] as shown.
2. Remove the toner supply unit casing [B] (2 pins) and development filter [C] and bracket [C] and clean them.
3. Stand up the development unit as shown (the drive section of the unit is the upper side).
4. Turn the paddle roller knob [D] clockwise. The developer will fall out onto the paper.
5. Repeat step 4 until all of the developer has been dumped out.
6. Clean the development unit prior to reassembling. Especially, clean the right end of the unit.

NOTE: 1) Keep the development unit connector at least 30 mm away from the development unit when the unit is cleaned using a vacuum cleaner.

2) Do not touch the pins of the development unit connector when the development unit is carried away from the main frame or cleaned.

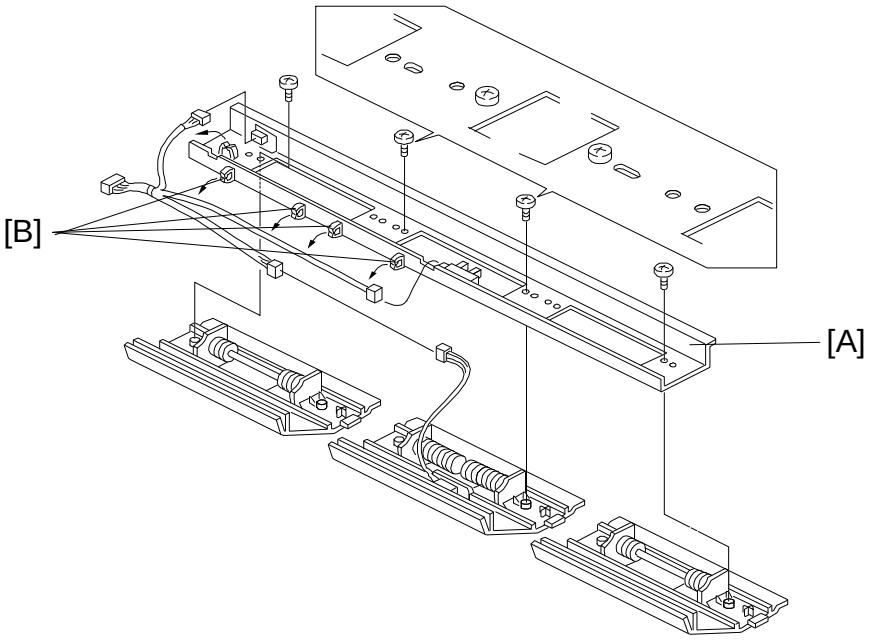
2.3 TONER DENSITY SENSOR REPLACEMENT



A174R510.wmf

1. Remove the development unit.
2. Disconnect the harness connector [A] and take the harness from the 2 clamps [B].
3. Remove the 2 screws [C] of the toner density sensor holder.
4. Pull out the harness from the toner density sensor side until the relay connector [D] appears.
5. Replace the toner density sensor [E] (2 screws and 1 connector).

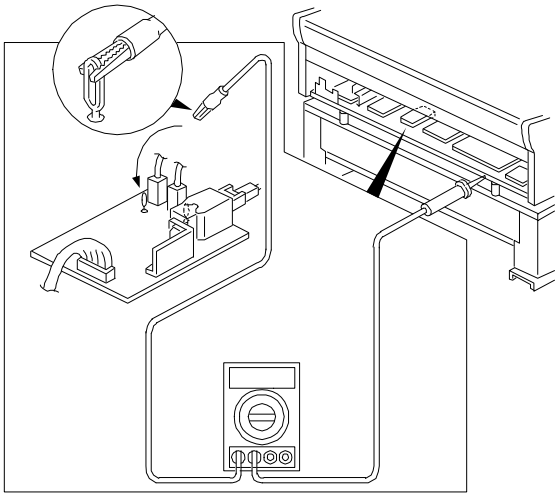
2.4 PTL REPLACEMENT



A174R511.wmf

1. Remove the paper feed driven unit (follow the steps from 1 to 5 of the development unit removal).
2. Remove the PTL assembly [A] (4 screws, 3 connectors, and 4 clamps [B]).

2.5 DEVELOPMENT BIAS VOLTAGE ADJUSTMENT



A174R512.wmf

NOTE: This adjustment is required when the charge/bias/grid power pack is replaced.

Preparation:

1. Turn off the main switch, and remove the rear cover.
2. Connect the ground terminal of the multimeter to the machine ground, and connect the voltage terminal to TP1 on the charge/bias/grid power pack.
3. Set the multimeter range to dc 1500 V.
4. Turn on the main switch.

2.5.1 Bias Voltage for Image Area

ADJUSTMENT STANDARD: dc –180 ± 10 V.

1. Access SP mode and select No. –25.
2. Press the "Roll Edge Cut" key to turn on the bias voltage.
3. Check the multimeter. If the voltage is not that of the standard voltage, press the "#" key and then change the voltage using "+" and "–" keys.
4. If the voltage is within that of the standard voltage, press the "#" key.

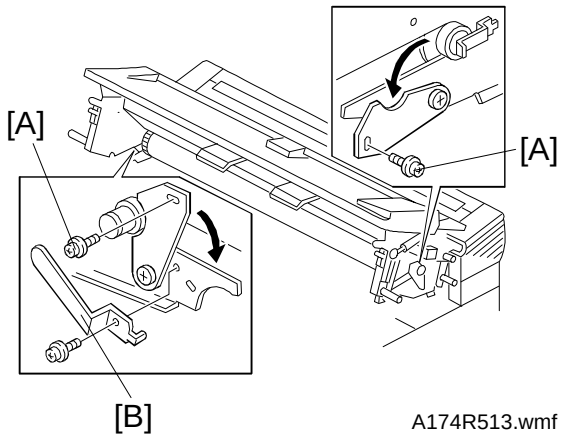
2.5.2 Bias Voltage for Non-image Area

ADJUSTMENT STANDARD: dc –200 ± 10V

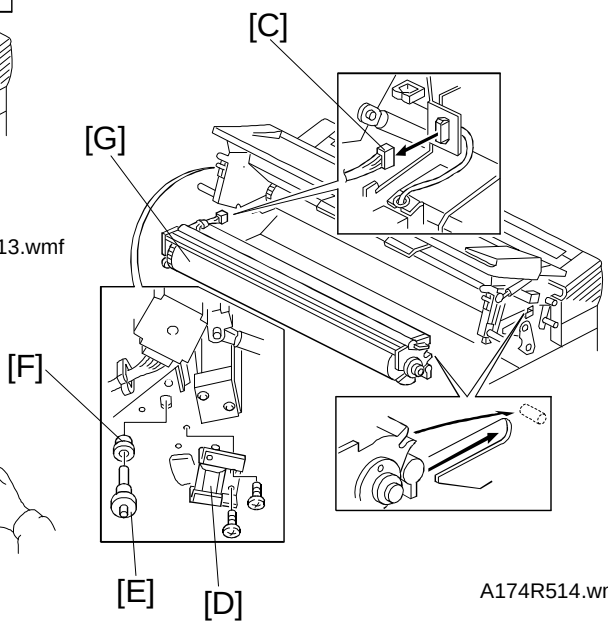
1. Access SP mode and select No. –26.
2. Press the "Roll Edge Cut" key to turn on the bias voltage.
3. Check the multimeter. If the voltage is not that of the standard voltage, press the "#" key and then change the voltage using "+" and "–" keys.
4. If the voltage is within the standard, press the "#" key.

3. DRUM UNIT

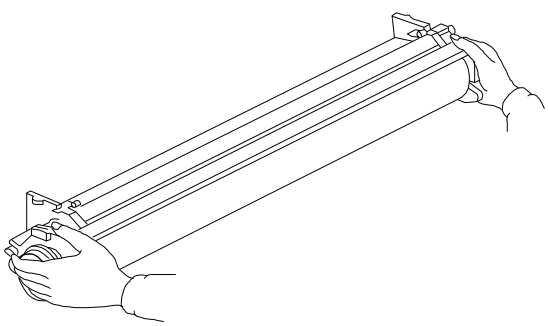
3.1 DRUM UNIT REMOVAL



A174R513.wmf



A174R514.wmf

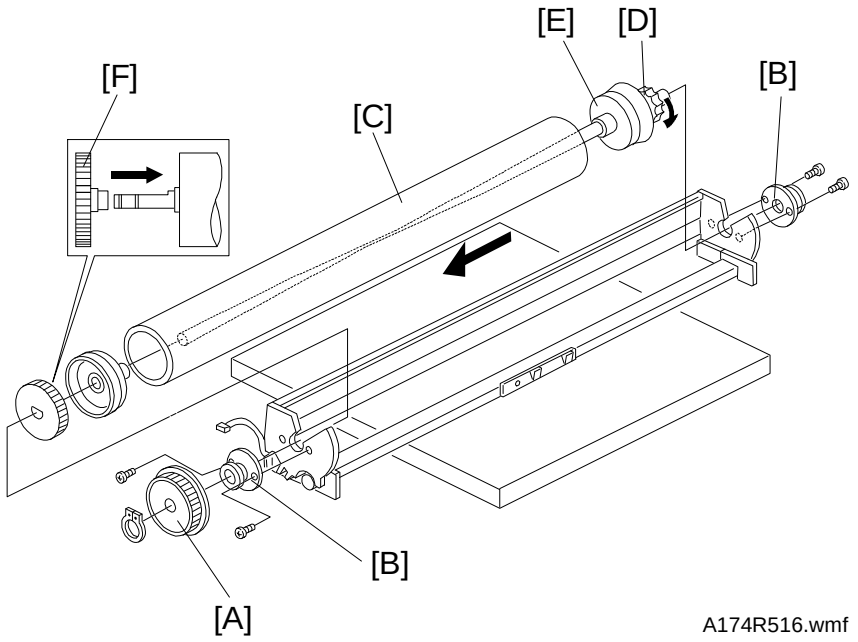


A174R515.wmf

1. Remove the development unit.
2. Remove the 2 screws [A] at both ends.
3. Remove grounding plate spring [B] (1 screw) and disconnect the harness connector [C].
4. Remove the charge wire cleaner motor (D), gear [E], and collar [F] (2 screws).
5. Remove the drum unit [G].
6. Place the drum unit on the flat floor.

NOTE: 1) When reinstalling the drum unit, hook the drum unit guides [H] on the pins [I] of the copier side plates.
2) Hold both ends of the drum unit to carry it.

3.2 DRUM REPLACEMENT

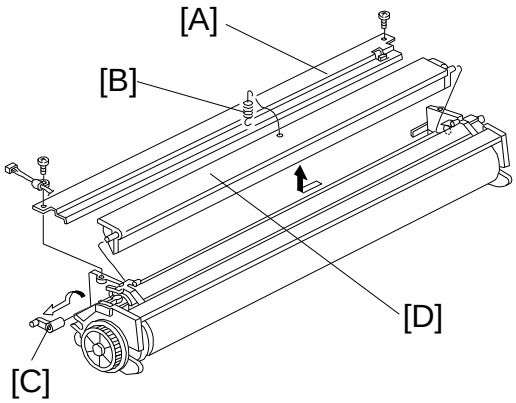


1. Remove the drum unit.
2. Remove the pulley [A] (1 C-ring).
3. Remove the 2 bearing holders [B] (2 screws each).

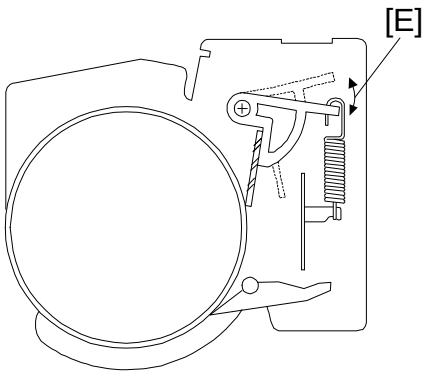
   NOTE: Be careful not to scratch the drum with the pick-off pawls when removing or reinstalling the drum.
4. Remove the drum [C] with the drum shaft.
5. Loosen the drum knob [D] by turning it clockwise as shown.
6. Remove the drum flange [E].
7. Replace the drum with new one.

   NOTE: when reinstalling the gear [F], make sure that the direction of the projection of the gear is on the drum side.

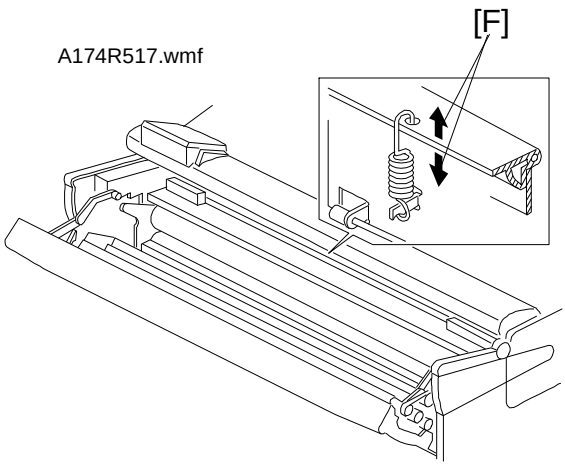
3.3 CLEANING BLADE REPLACEMENT



A174R517.wmf



A74R518.wmf



A74R519.wmf

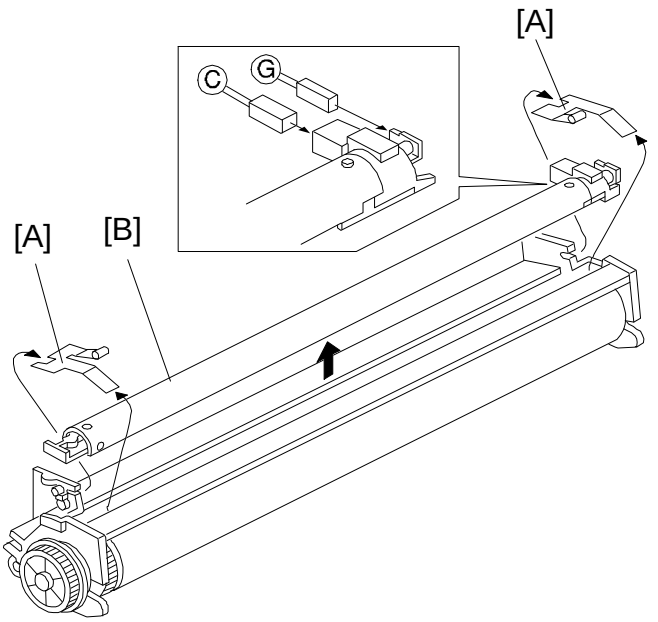
1. Remove the drum unit.
2. Remove the quenching lamp unit [A].
3. Remove the pressure spring [B] and bushing [C].
4. Slide the cleaning blade [D] to the left side and remove it from the right side.

NOTE: 1) Do not press the cleaning blade too strongly. Otherwise, the drum unit may deform.

2) When installing or replacing the cleaning blade, release the pressure [E] several times manually, and then hold down the cleaning blade gently along its entire length to ensure that the cleaning blade contacts the drum. Even if the drum is installed already, this action [F] can be taken through the rear side from where the rear feed table assembly is removed (follow steps 1 to 3 of the ozone filter replacement).

3) When replacing the cleaning blade, apply setting powder on the edge of the cleaning blade.

3.4 CHARGE CORONA UNIT REMOVAL

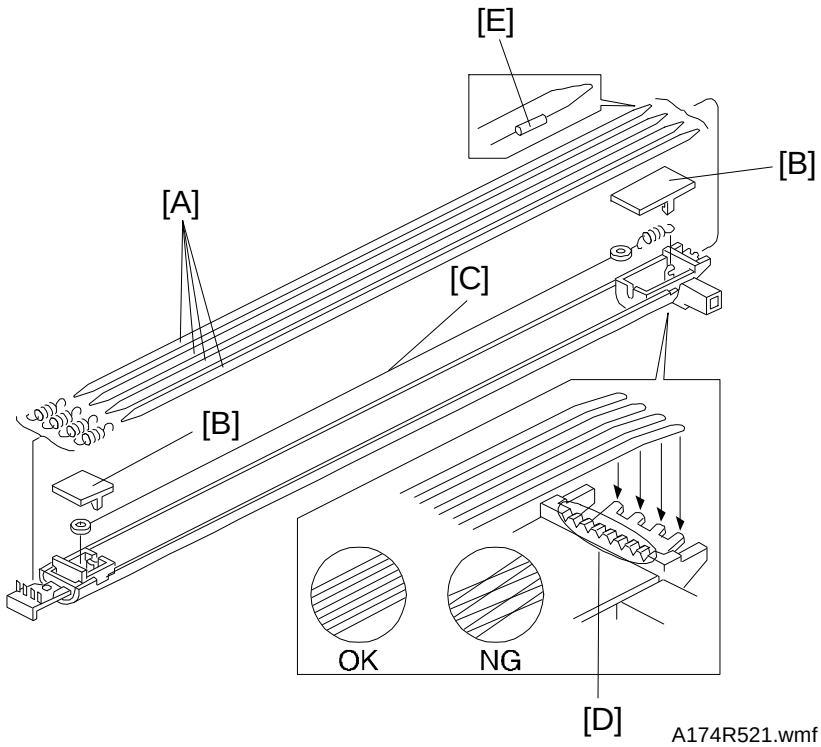


A174R520.wmf

1. Remove the drum unit.
2. Remove the ground springs [A].
3. Remove the charge corona unit [B] (2 connectors).

NOTE: When reinstalling the charge corona unit, make sure that the 2 connectors (C for the charge corona, G for the grid bias) are set properly.

3.5 CHARGE CORONA WIRE REPLACEMENT

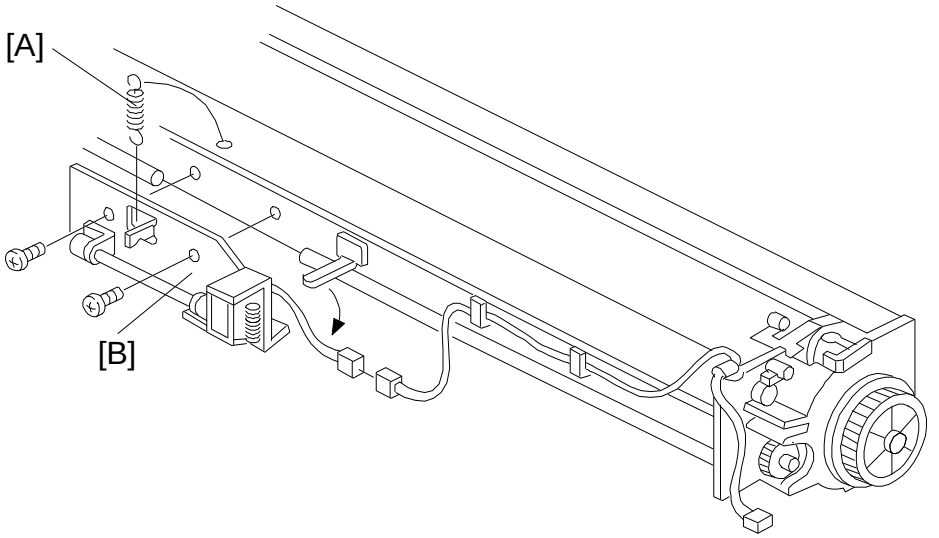


1. Remove the charge corona unit.
2. Remove the 4 grid wires [A] (4 springs).

   NOTE: Keep the grid wires with taping one ends of them and hanging them to prevent the wires from bent or being damaged.
3. Remove the endblock covers [B].
4. Replace the corona wire [C] (1 spring).

   NOTE: 1) Make sure that the grid wires are correctly placed on the eight slots [D], are all straight, and not crossed.
   2) Handle the new wire by the ends only. Oil from your hands may cause uneven charge on the drum.
   3) Do not expand and bend the corona wires and grid wires.
   4) Do not rub the corona wires with rough material (sand paper,... etc.) as this will damage the corona wire.
   5) Do not use any solvent to clean the wire as this will cause uneven charge on the drum.
   6) Make sure that the wire junction [E] is positioned inside the right endblock.

3.6 PICK-OFF PAWL UNIT REMOVAL

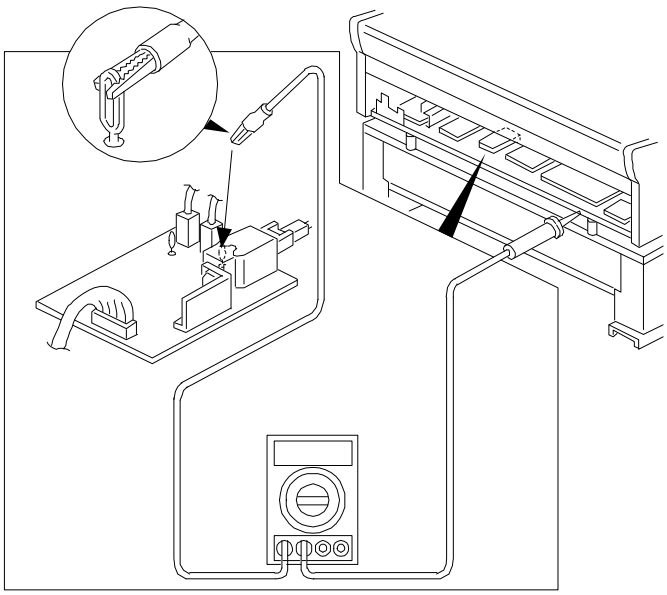


A174R522.wmf

1. Remove the drum unit and place it as shown.
2. Remove the pressure spring [A] and pick-off pawl unit [B] (2 screws and 1 connector).

   NOTE: When installing and/or removing the pick-off pawl unit, do not press too strongly. Otherwise, the drum unit may deform.

3.7 GRID VOLTAGE ADJUSTMENT



A174R523.wmf

ADJUSTMENT STANDARD: dc –940 ± 10V**.**

NOTE: This adjustment is required when the charge/bias/grid power pack is replaced.

1. Turn off the main switch and remove the rear cover.

2. Connect the ground terminal of the multimeter to the machine ground, and connect the voltage terminal to TP2 on the charge/bias/grid power pack.

3. Set the multimeter range to dc 1500 V.

4. Turn on the main switch.

5. Access SP mode and select No. –14.

6. Press the "Roll Edge Cut" key to turn on the grid voltage.

7. Check the multimeter. If the voltage is not that of the standard voltage, press the "#" key and then change the voltage using "+" and "–" keys.

8. If the voltage is within that of the standard voltage, press the "#" key.

3.8 DRUM CURRENT ADJUSTMENT

NOTE: 1) The drum currents vary with environmental conditions such as humidity and atmospheric pressure. Generally it is not necessary to adjust the drum currents because they have already been adjusted for a wide range of environments at the factory.

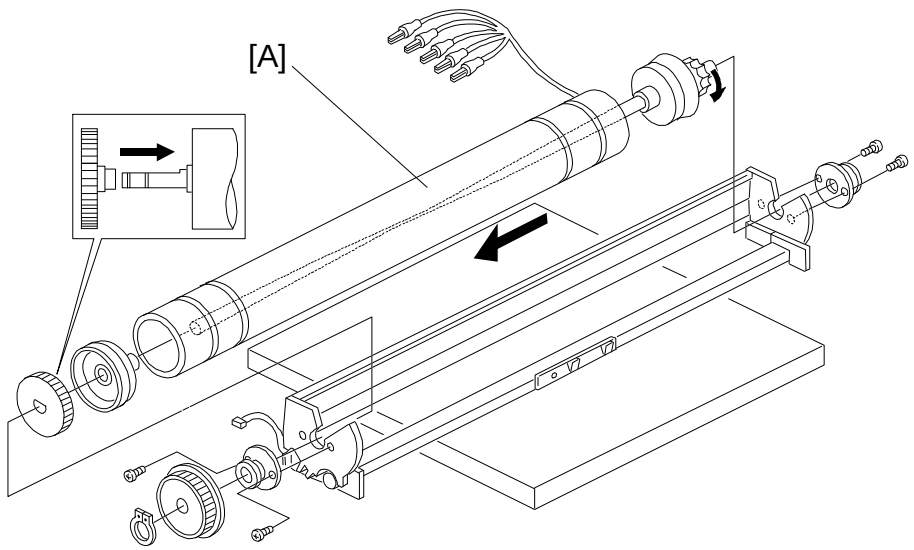
2) Drum current adjustment is necessary whenever the power packs are replaced: adjustment may also be necessary to correct problems with paper separation, incomplete toner transfer, or image density.

3) Make sure that the main switch is turned off when you change the range on the digital multimeter. If it is not, the multimeter may be damaged.

4) There are variable resistors to change the charge currents, but they should not be changed. The drum currents should be adjusted by changing SP mode setting.

Preparation

1. Remove the developer unit.
2. Remove the drum unit.
3. Remove the OPC drum from the drum unit, and install the current measurement drum [A] instead of the OPC drum.



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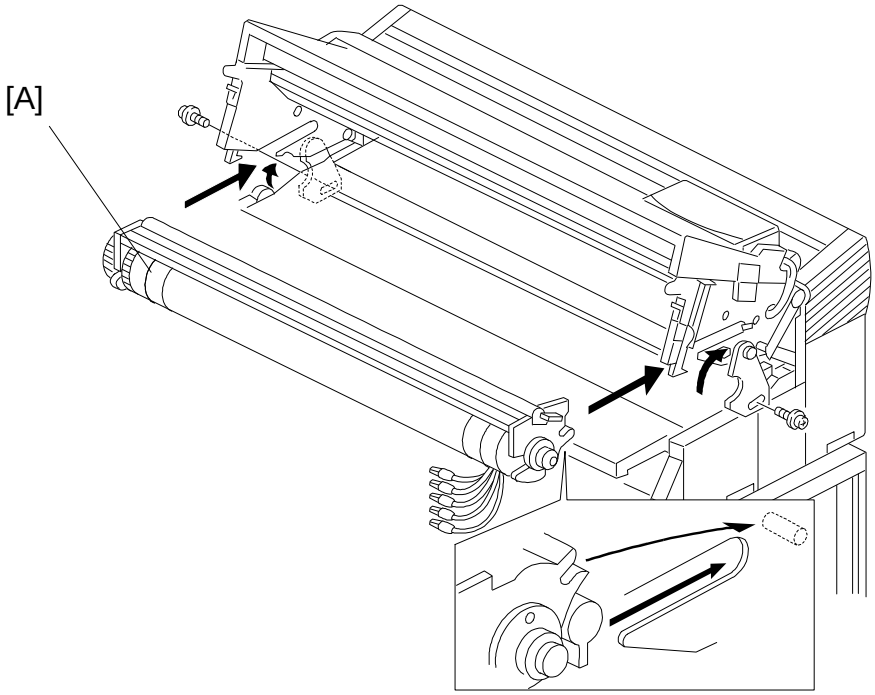
4. Install the drum unit [A] on the machine.

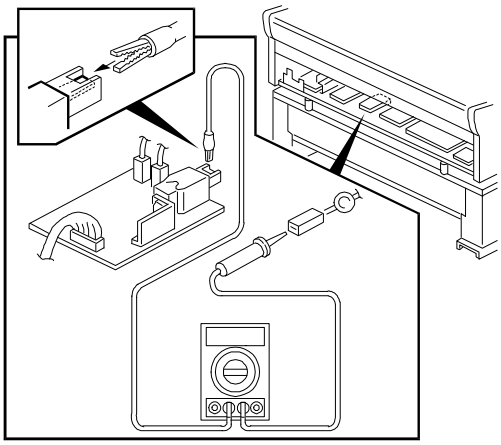


A174R525.wmf

⚠ CAUTION

Be careful not to turn on the main motor. If the main motor accidentally turns on, some parts around the drum may be damaged.

3.8.1 Charge Current Adjustment



A174R526.wmf

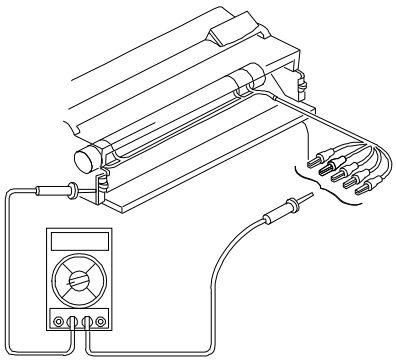
ADJUSTMENT STANDARD: dc–1250 ± 20 μA

⚠ WARNING

Make sure that the machine is unplugged before connecting the multimeter on the charge/bias/grid power pack.
Pay extreme attention when connecting the multimeter. The potential of the charge corona terminal becomes –5kV.

1. Connect all the terminals of the current measurement drum to the machine ground.
2. Disconnect the charge corona terminal of the charge/bias/grid power pack.
3. Connect the multimeter as shown in the illustration.
4. Set the multimeter range at dc 2 mA.
5. Plug in the machine and turn on the main switch.
6. Access SP mode and select No. –13.
7. Press the "Roll Edge Cut" key to turn on the charge corona.
8. Check the multimeter. If the voltage is not that of the standard voltage, press the "#" key and then change the voltage using "+" and "–" keys so that the charge current is dc –1250 ± 20 μA.
9. If the voltage is within that of the standard voltage, press the "#" key.

3.8.2 Transfer Current Adjustment



A174R527.wmf

ADJUSTMENT STANDARD:
dc –120 ± 5 μA (①)
dc –260 ± 5 μA (②)

	Plain Paper Manual Feed	Plain Paper Roll Feed	Translucent Paper	Film
From leading edge to 145 mm	②	①	②	① x 1.67
From 145 mm to 149 mm of leading edge	②	①	(① + ②)/2	① x 1.67
From 149 mm from leading edge to 20 mm from trailing edge.	②	①	①	① x 1.67
From 20 mm to trailing edge	②	① x 1.67	①	① x 1.67

② : PTL off
In translucent paper mode, PTL turns on after leading edge of paper advance 170 mm a head of the drum.

1 Connect the multimeter as shown above.

2. Set the multimeter range at dc 200 μA.

3. Plug in the machine and turn on the main switch.

4. Access SP mode and select No. –15.

5. Press the "Roll Edge Cut" key to turn on the transfer corona.

6. Check the multimeter. Press the "#" key and then change the voltage using "+" and "–" keys so that the transfer current is dc –120 ± 5 μA.

7. If the voltage is within that of the standard voltage, press the "#" key.

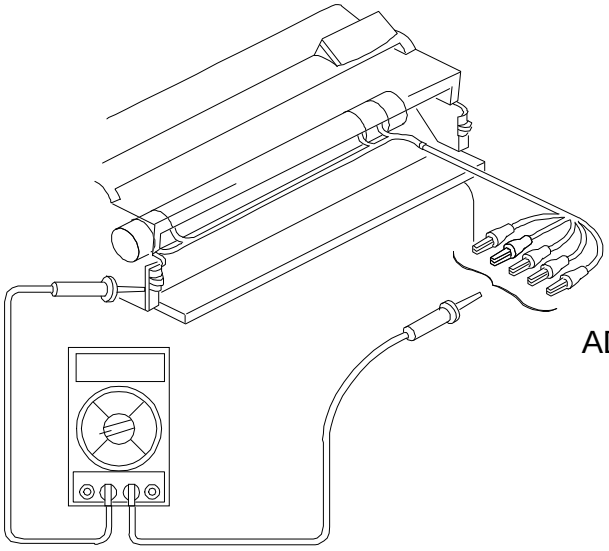
8. Select SP mode No. –16.

9. Press the "Roll Edge Cut" key to turn on the transfer corona.

10. Check the multimeter. Press the "#" key and then change the voltage using "+" and "–" keys so that the transfer current is dc –250 ± 5 μA.

11. If the voltage is within that of the standard voltage, press the "#" key.

3.8.3 Separation Current Adjustment



ADJUSTMENT STANDARD:
① ac 250 ± 10 μA
dc -10 ± 1 μA
② ac 350 ± 10 μA
dc –10 ± 1 μA

A174R527-2.wmf

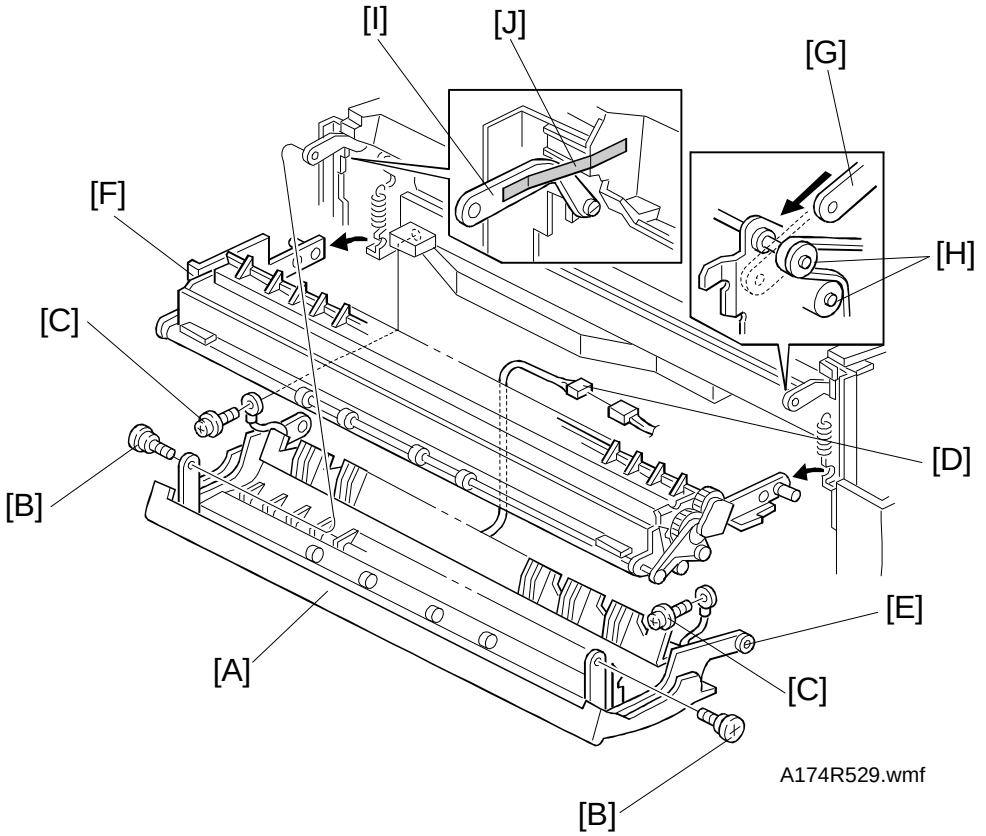
	Plain Paper Roll Feed	Plain Paper Manual Feed	Translucent Paper	Film
From leading edge to 30 mm	①	②	②	(① + ②)/2
Others	①	①	①	(① + ②)/2

1. Connect the multimeter as shown above.
2. Set the multimeter range at ac 2 mA.
3. Plug in the machine and turn on the main switch.
4. Access SP mode and select No. –18.
5. Press the "Roll Edge Cut" key to turn on the separation corona.
6. Check the multimeter. Press the "#" key and then change the current using "+" and "–" keys so that the ac separation current is ac 250 ± 10 μA.
7. If the voltage is within that of the standard voltage, press the "#" key.
8. Select SP mode No. –20
9. Press the "Roll Edge Cut" key to turn on the separation corona.
10. Check the multimeter. Press the "#" key and then change the current using "+" and "–" keys so that the ac separation current is ac 350 ± 10 μA.
11. If the voltage is within that of the standard voltage, press the "#" key.

12. Set the multimeter range at dc 200 μA.
13. Select SP mode No. –19.
14. Press the "Roll Edge Cut" key to turn on the separation corona.
15. Check the multimeter. Press the "#" key and then change the current using "+" and "–" keys so that the dc separation current is dc –10 ± 1 μA.
16. If the voltage is within that of the standard voltage, press the "#" key.
17. Select SP mode No. –21.
18. Press the "#" key to turn on the separation corona.
19. Check the multimeter. Press the "#" key and then change the current using "+" and "–" keys so that the dc separation current is dc –10 ± 1 μA.
20. If the voltage is within that of the standard voltage, press the "#" key.

4. FUSING

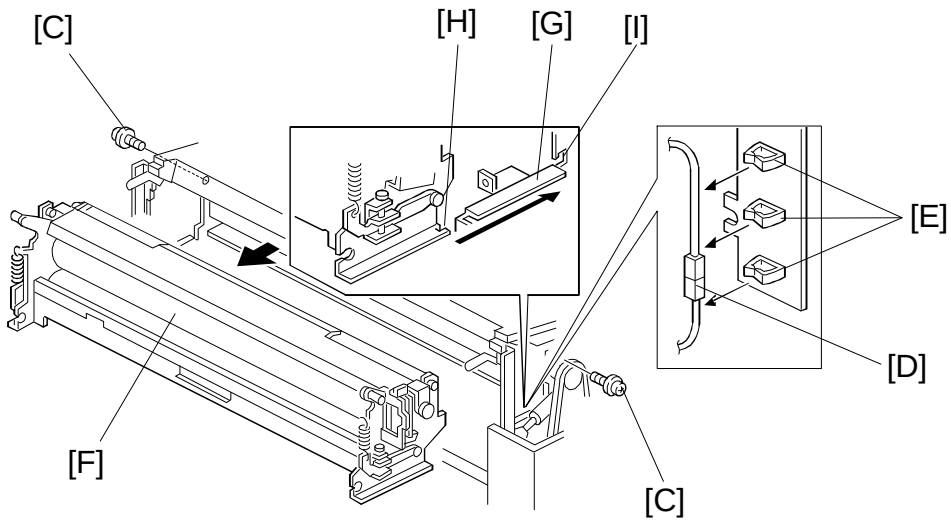
4.1 FUSING UNIT REMOVAL



NOTE: Close the paper path section to remove and reinstall the fusing unit.

1. Remove the copier rear cover.
2. Open the exit cover [A] and remove the shoulder screws [B] at both ends. Remove the screws [C] for the grounding wires.
3. Disconnect the connector [D] and flex the hinge arms [E] of the exit cover slightly to the outside of the exit unit shafts and remove.
4. Turn the exit unit [F] 1/4 of a turn to the front side (rear view) and remove it by pulling out.

   NOTE: When reinstalling the exit unit, set the right hinge [G] between the two pulleys [H] and raise the left hinge [I] using tape [J].



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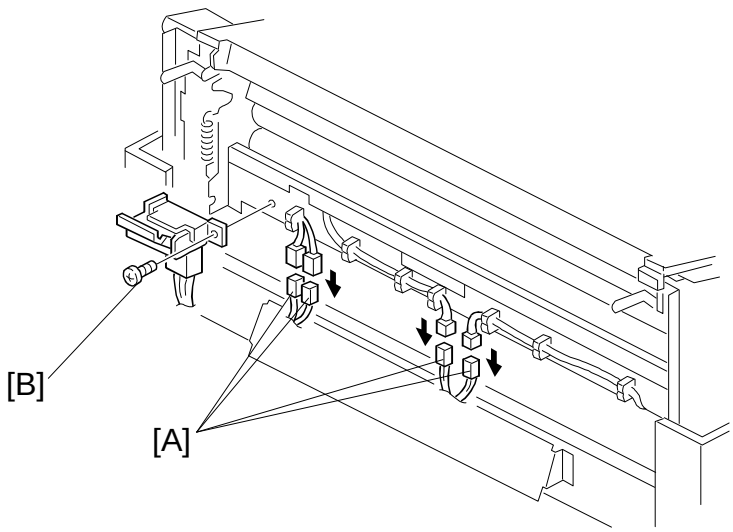
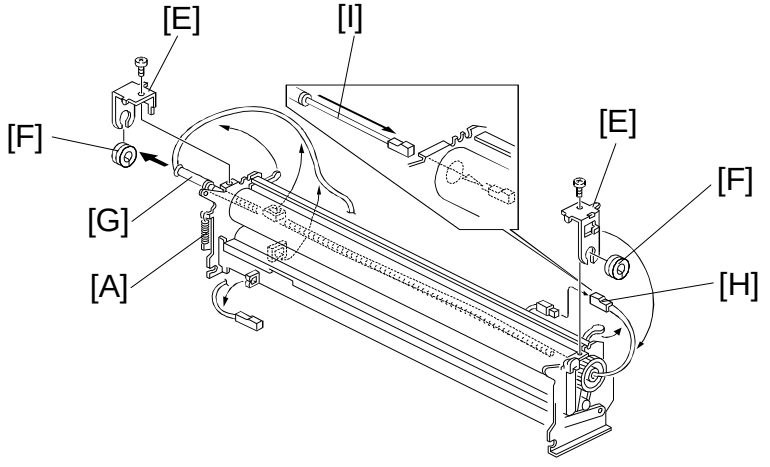


A174R531.wmf

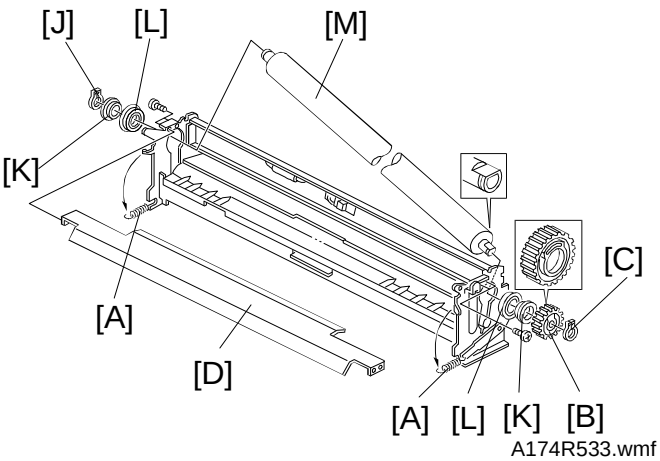
5. Disconnect the connectors [A].
6. Remove the screw [B] fixing the safety switch bracket.
7. Remove the 2 screws [C] and disconnect lamp harness [D] from the clamps [E].
8. Pull out the fusing unit [F].

NOTE: Set the fusing unit on the guides [G] and align the cuts [H] to the side plates [I] at both ends when reinstalling the fusing unit.

4.2 HOT ROLLER REPLACEMENT



A174R532.wmf



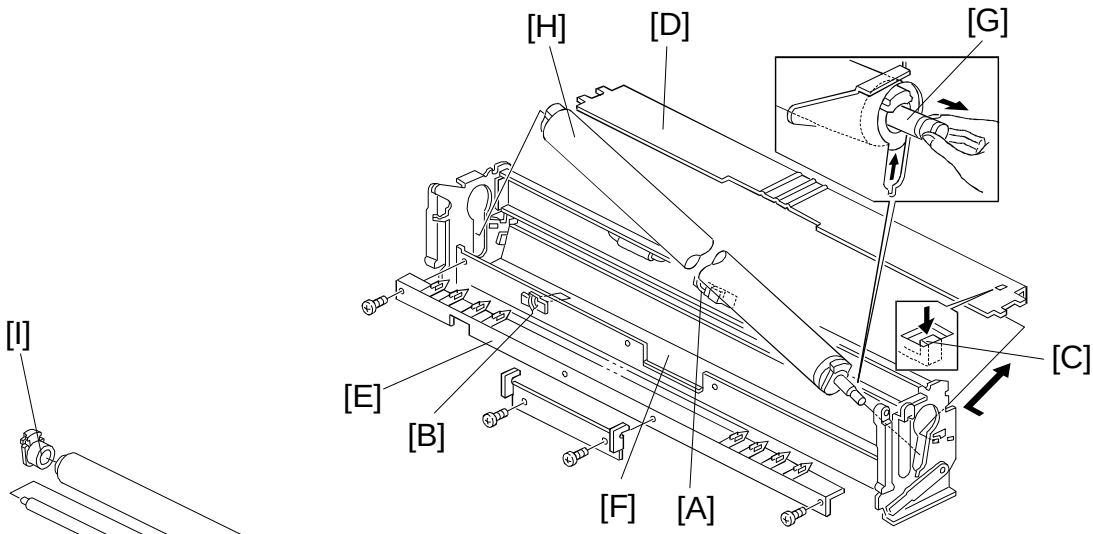
A174R533.wmf

NOTE: Be careful not to damage the hot roller thermistor when removing and reinstalling the hot roller.

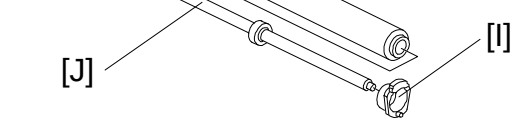
1. Remove the fusing unit.
2. Remove the pressure springs [A].
3. Remove the gear [B] (1 C-ring [C]) and the upper plate [D] (4 screws).
4. Remove the fusing lamp brackets [E] and cushions [F] (1 screw each).
5. Remove the fusing lamp [G] from the left side as shown (1 connector [H], rear view).

   NOTE: When reinstalling the fusing lamp, straighten the short harness [I] to allow it of the right side to pass through the hot roller hole (rear view).
6. Remove the C-ring [J], 2 bushings [K], and 2 bearings [L]).
7. Slide the hot roller [M] to the right side and remove it from the left side.

4.3 PRESSURE ROLLER REPLACEMENT



A174R534.wmf



A174R535.wmf

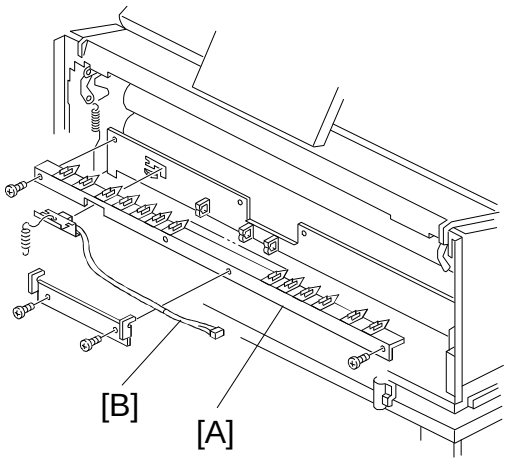
⚠ CAUTION

1. Do not touch the hot roller or pressure roller while they are hot.

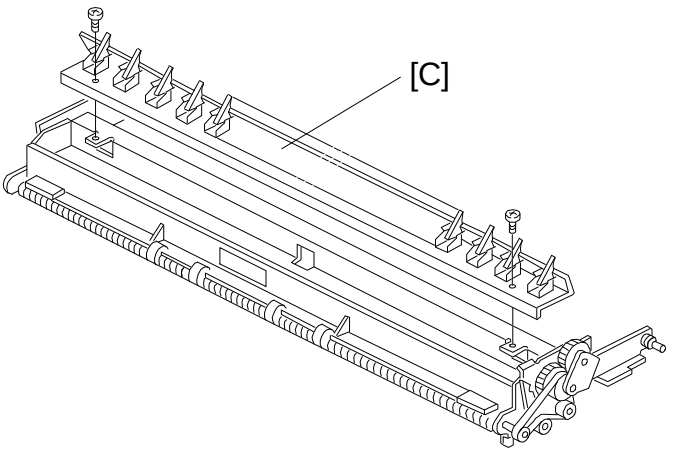
2. Be careful not to damage the hot roller thermistor [A]and pressure roller thermistor [B] when removing and reinstalling the pressure roller.

1. Remove the hot roller.
2. Push the projection [C] of the fusing entrance guide stopper and remove the fusing entrance guide [D].
3. Remove the pressure roller stripper unit [E] (4 screws).
4. Lift up the pressure roller (access the hot roller from the cut [F] of the frame), slide out the pressure roller shaft [G] to the left, then remove the pressure roller [H].
5. Replace the pressure roller (2 stoppers [I] and 1 shaft [J]).

   NOTE: When reinstalling pressure roller, set the right pressure roller stopper and push the pressure roller shaft to the right from the left, and set the left pressure roller stopper [I].



A174R536.wmf



A174R537.wmf

4.4 PRESSURE ROLLER STRIPPER UNIT REPLACEMENT

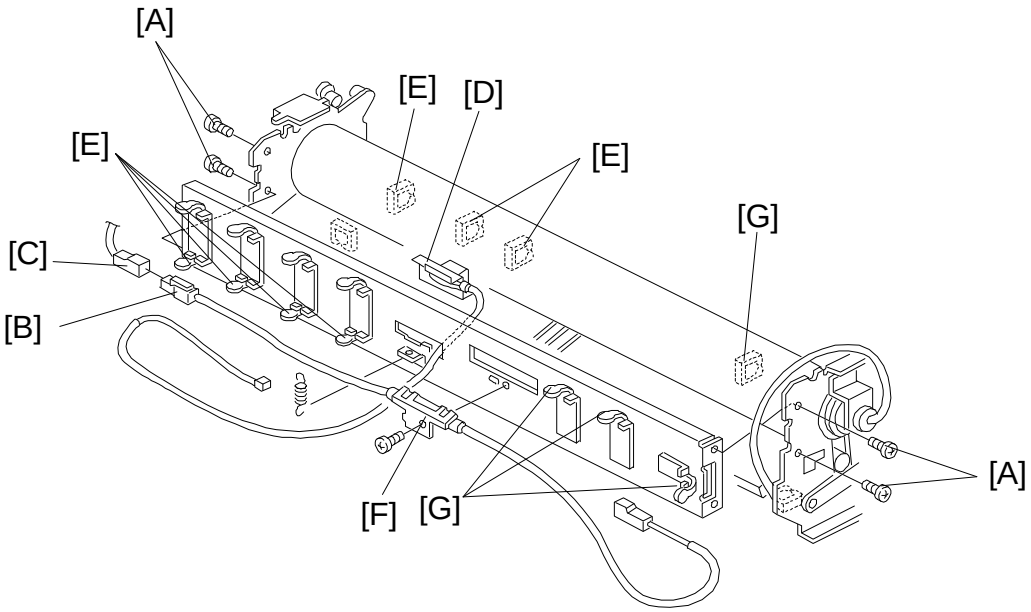
1. Follow step 1 to 5 of the fusing unit removal.
2. Remove the pressure roller stripper unit [A] (4 screws).

4.5 PRESSURE ROLLER THERMISTOR REPLACEMENT

1. Remove the pressure roller stripper unit.
2. Remove the pressure roller thermistor [B] (1 screw).

4.6 HOT ROLLER STRIPPER UNIT REPLACEMENT

1. Follow step 1 to 4 of the fusing unit removal.
2. Remove the hot roller stripper unit [C] (2 screws).



A174R538.wmf

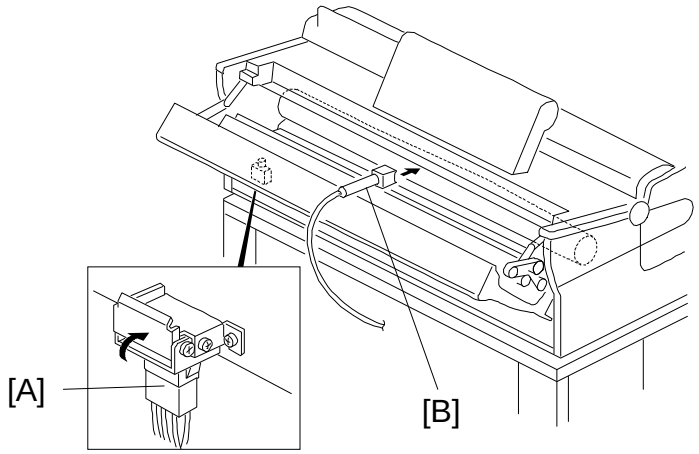
4.7 HOT ROLLER THERMISTOR REPLACEMENT

1. Remove the fusing unit.
2. Remove the 4 screws [A] of the fusing stay.
3. Disconnect the thermofuse connector [B] from the fusing lamp harness [C].
4. Remove the hot roller thermistor [D] (1 screw and 1 spring, 7 clamps [E]).

4.8 FUSING THERMOFUSE REPLACEMENT

1. Follow step 1 to 3 of the hot roller thermistor replacement.
2. Remove the fusing thermofuse [F] (1 screw and 4 clamps [G]).

4.9 FUSING TEMPERATURE ADJUSTMENT



A174R539.wmf

⚠ CAUTION

When the main switch is turned on, the machine will suddenly start to drive the fusing section. Keep your hands away from any mechanical and electrical components during this period.

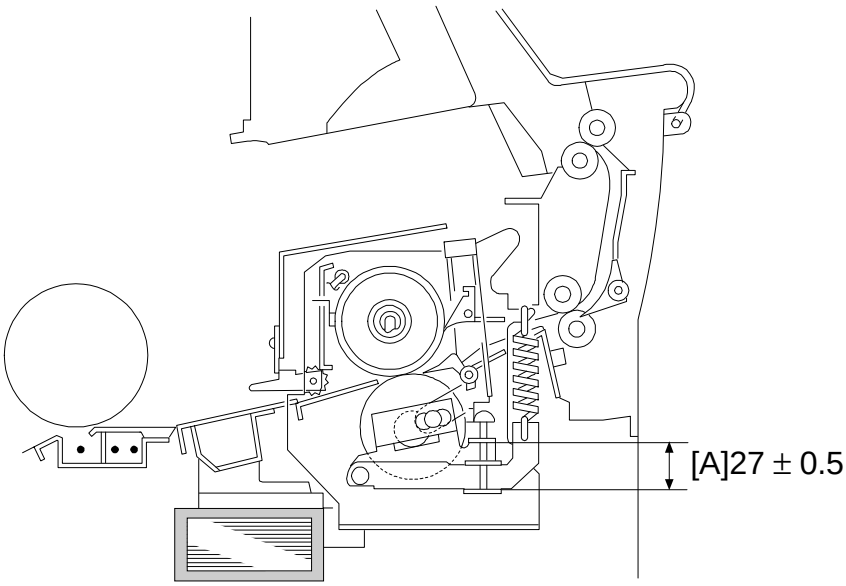
This procedure is required only when the hot roller thermistor is replaced.

ADJUSTMENT STANDARD: 170°C ± 3°C Film Mode: Low Mode 1

1. Access SP#60 and set "1". Access SP#3 and set "1".
2. Turn off the main switch.
3. While pressing the emergency key, turn on the main switch. Select low mode by the fusing temperature key and turn off and on the main switch.
4. Remove the copier rear cover.
5. Remove the pressure roller thermistor screw and hang the thermistor by the harness.
6. Actuate the fusing exit safety switch [A].
7. Turn on the main switch, select output mode No. 6 (fusing lamp), and wait for longer than 10 minutes.
8. Turn on output mode No. 30 (fusing motor) while turning on output mode No. 6.
9. Using a digital thermometer and probe [B], measure the temperature at the middle of the hot roller after wait for longer than 10 minutes.

10. If the actual temperature is different from the value, adjust the temperature using SP#–6.
11. Repeat steps 7 to 10 and confirm the temperature.
12. Reassemble the machine.

4.10 FUSING NIP BAND CONFIRMATION



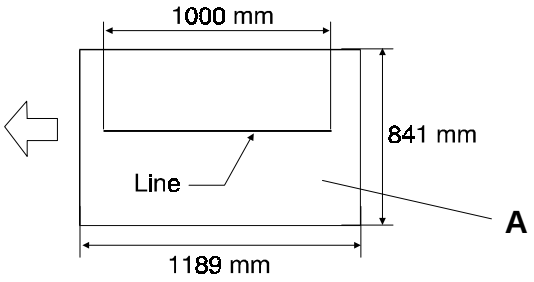
A174R550.wmf

Adjustment Standard 27 ± 0.5 mm

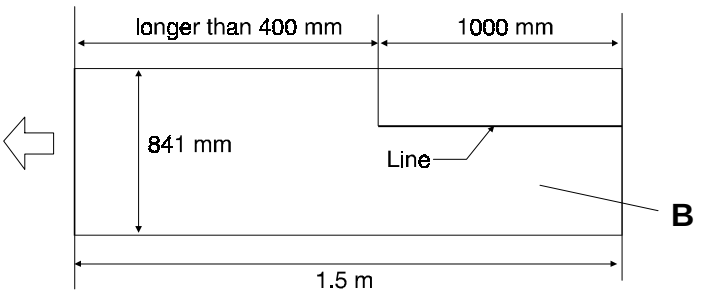
When the hot and/or pressure roller(s) is replaced, confirm the gap instead of measuring the nip width.

1. Measure the gap [A] using a scale.

4.11 FUSING MOTOR SPEED ADJUSTMENT



A174R547.wmf



A174R548.wmf

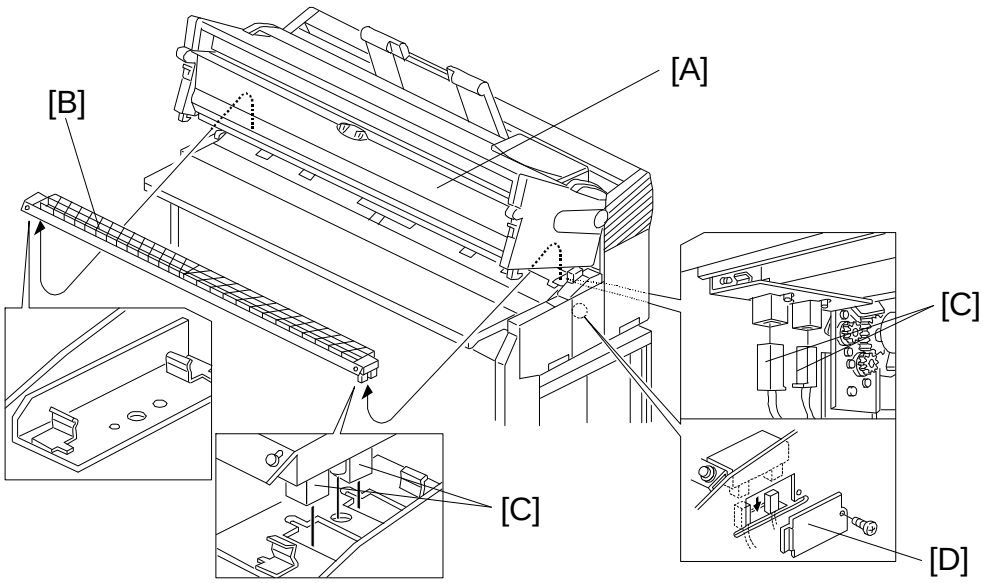
NOTE: Prepare test charts (A and B) by drawing the lines as shown.

1. Remove the four small separation rollers in front of the fusing unit.
2. Access SP#-29 (fusing motor adjustment) and set it to "0".
3. Make three copies of the test chart [A] from the 1st roll feeder, using 841 mm width paper.
4. Measure the difference of the length between each copy sample and the 1000 mm line on the original. Then, calculate the average difference (L0, %).
5. Access SP#-29 and input the value (target:30) and set SP#-28 to 1.
6. Make three copies of the test chart [B] from the 1st roll feeder, using 841 mm width paper.
7. Measure the difference of the length between each copy sample and the 1000 mm line on the original trailing area of the original. Then, calculate the average difference (L1, %).
8. Make sure that L1=L0+{0.25±0.05(%)}. If the formula is not correct, repeat steps 5 to 8. Try to change SP#-29.
9. Return SP#-28 to "0" by changing SP#–28 setting and install the four small separation rollers.

NOTE: The length should be measured 3 minutes or later after copying because the fusing unit dries the paper and reduces its length temporarily.

5. T & S CORONA UNIT

5.1 T & S CORONA UNIT REMOVAL



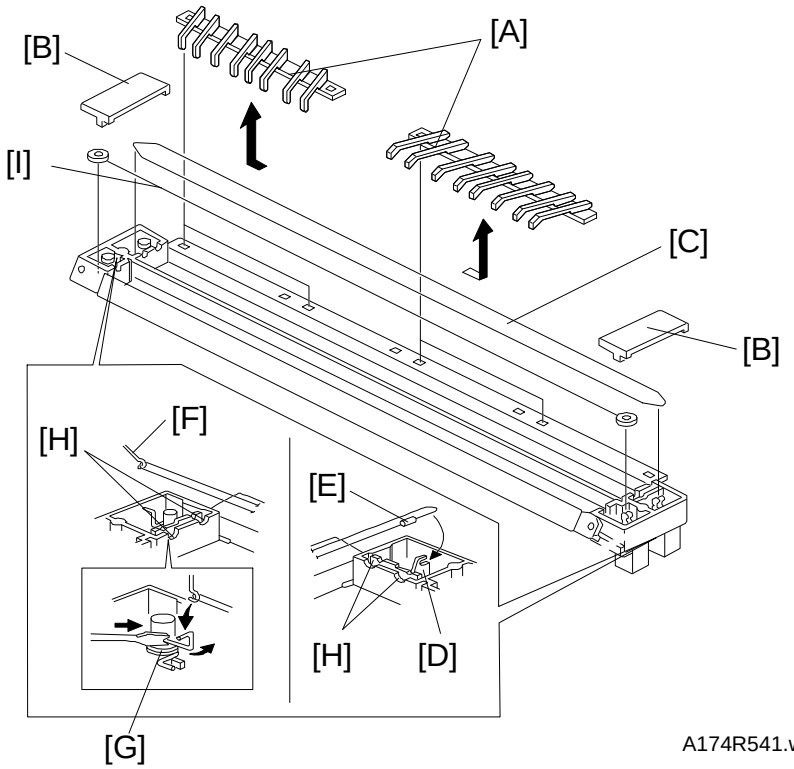
A174R540.wmf

1. Open the paper path section [A] and take out the T & S corona unit [B] (2 connectors [C]).

   NOTE: 1) Make sure that the T & S corona unit is set correctly by pressing it down when reinstalling.

   2) Remove the connector cover [D] (1 screw) for connecting the 2 connectors.

5.2 TRANSFER AND SEPARATION CORONA WIRE REPLACEMENT



NOTE: 1) Handle the new wire by the ends only. Oil from your hands may cause uneven charging of the drum.

2) Do not stretch or bend the corona wires.

3) Do not rub the corona wires with rough material (sand paper, etc.) as this will damage the corona wire.

4) Do not use any solvent to clean the wire as this will cause uneven charging of the drum.

5.2.1 Preparation

1. Remove the T & S corona unit.
2. Remove the paper guides [A] and endblock covers [B].

5.2.2 Separation Corona Wire Replacement

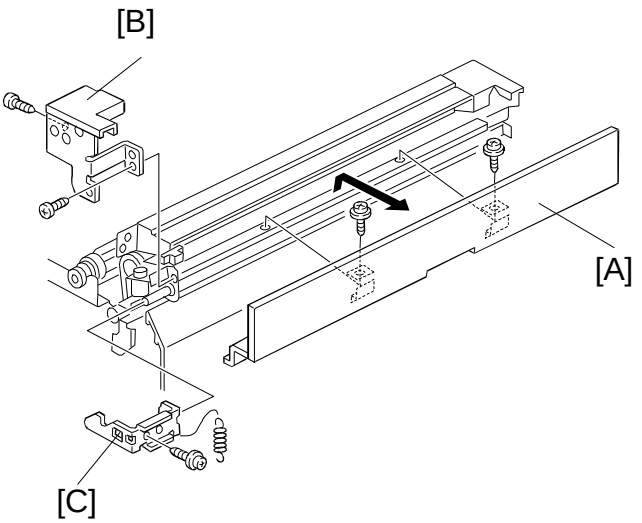
1. Remove the separation corona wire [C].
2. Hook the new separation corona wire on the terminal [D] of the right endblock.

   NOTE: Make sure that the wire junction [E] is positioned inside the right endblock.
3. Hook the other side of the separation corona wire on the spring hook [F] (special tool: A1639504, A1639505). While pushing the spring [G] in the direction of the arrow, hook the separation corona wire on the spring.
4. Set the wire on the slots [H].

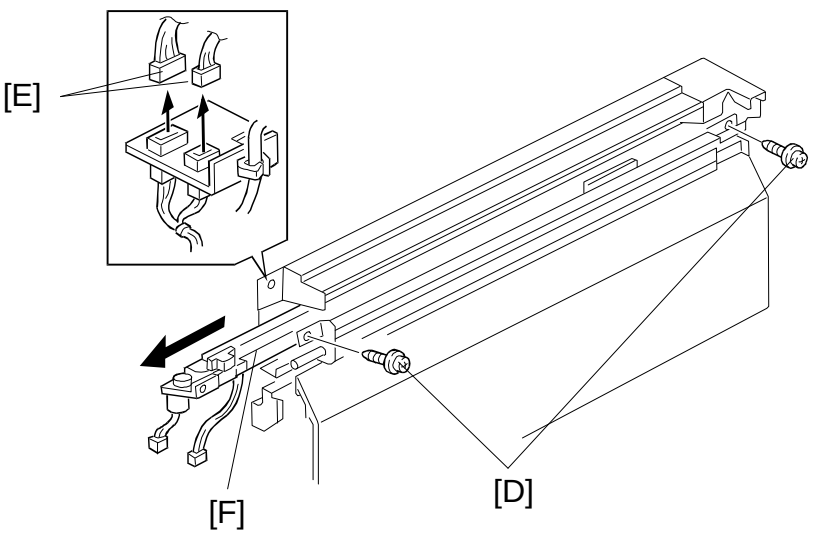
5.2.3 Transfer Corona Wire Replacement

1. Remove the transfer corona wire [I].
2. Install the new transfer corona wire.

6. CUTTER UNIT REPLACEMENT



A174R545.wmrf

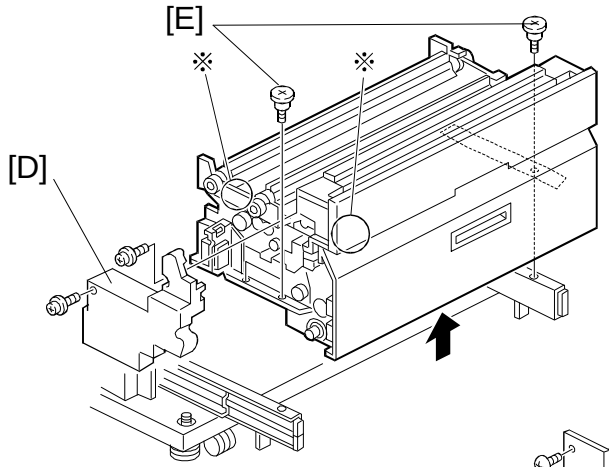


A174R546.wmf

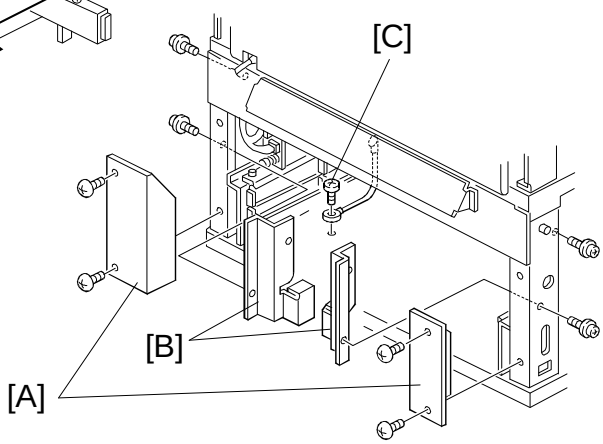
1. Remove the 1st & 2nd cover [A] (2 screws) and the roll reed left inner cover.
2. Remove the left bracket [B] (2 screws) and left lock lever [C] (1 screw and 1 spring).
3. Remove the two screws [D] and disconnect the two connectors [E] of the cutter unit.
4. Slide out the cutter unit [F] as shown.

7. ROLL FEEDER UNIT AND IMAGE PRODUCTION UNIT REMOVAL

7.1 ROLL FEED UNIT REMOVAL



A174R551.wmf



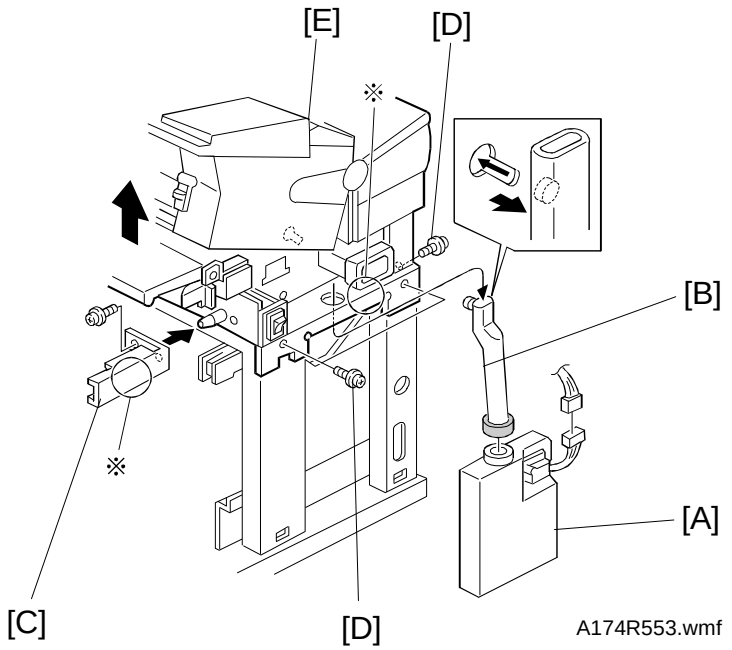
A174R552.wmf

To facilitate transportation by hand the upper part of the copier (image production unit) and the lower part of the copier (roll feed unit) can be removed.

1. Pull out the roll feed unit.
2. Remove the stand rear covers [A] (2 screws each) and feed harness covers [B] (2 screws each).

   NOTE: When re-attaching the covers, be careful not to pinch the harnesses with covers.
3. Remove the screw [C] for the grounding wire.
4. Remove the copier rear cover.
5. Remove the left inner cover [D] (2 screws).
6. Remove the 4 shoulder screws [E] (right side 2 screws and left side 2 screws).
7. Lift up the roll feed unit by gripping the circled parts (right and left) and place the roll feed unit onto a flat floor.

7.2 IMAGE PRODUCTION UNIT REMOVAL



⚠ CAUTION

Do not remove the image production unit before removing the roll feed unit. Otherwise, the machine could topple over when pulling out the roll feed unit.

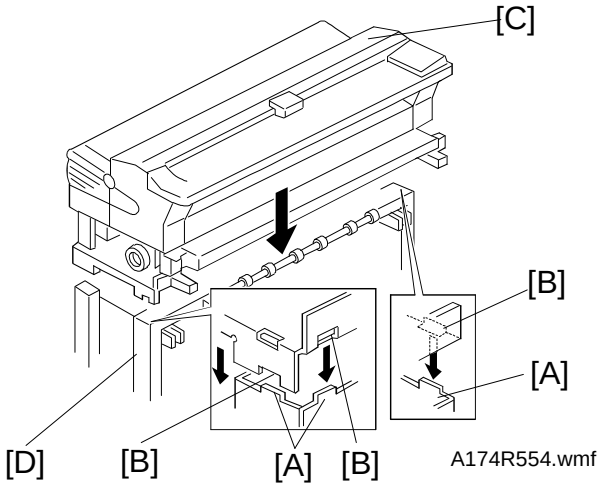
1. Remove the roll feed unit (refer to the roll feed unit removal).
2. Remove the toner collection bottle [A] (1 connector) and toner collection pipe [B].
3. Re-install the upper shipping retainers [C] (right and left: 2 screws each), which were removed at the installation.

⚠ CAUTION

To lift up the image production unit, two persons or more must hold the parts indicated by "*" in the illustration.
The lock plates [C] must be installed. Otherwise, the image production unit could overbalance.

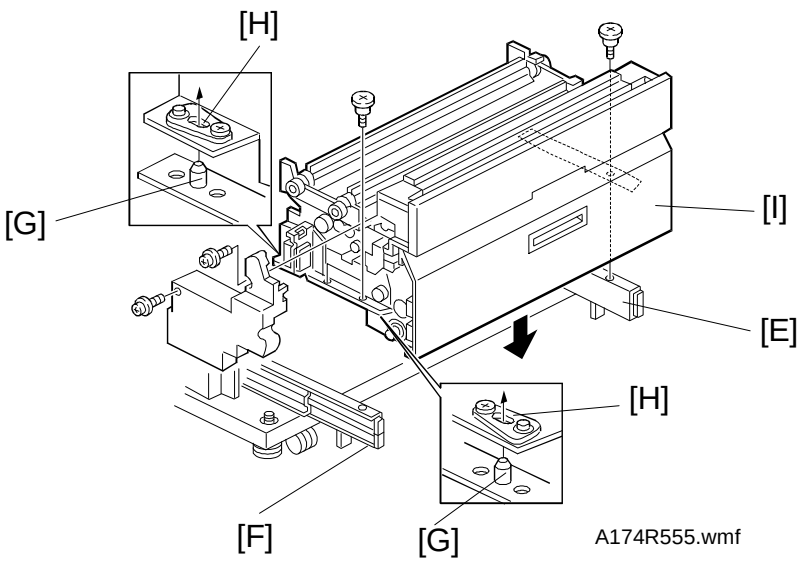
4. Remove the 6 screws [D] (right and left: 3 screws each).
5,. Lift up the image production unit [E] by gripping the parts indicated by "※" (both right and left) and place the image production unit onto a flat floor.

7.3 RE-INSTALLING IMAGE PRODUCING UNIT



1. While aligning the cutouts [A] in the stand with the cutouts [B] in the image production unit, place the image production unit [C] on the stand [D].
2. Re-assemble all the machine.

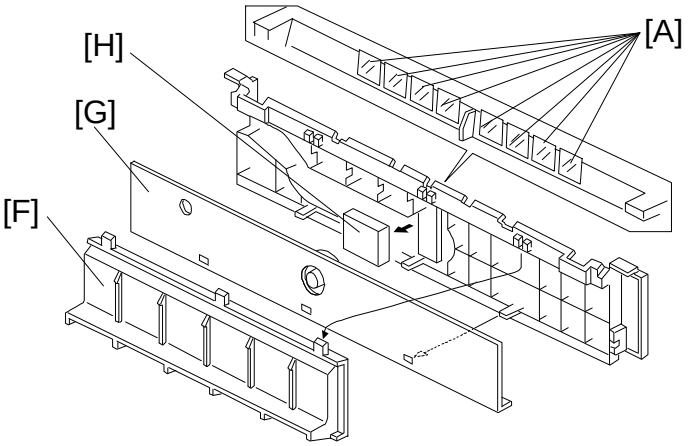
7.4 RE-INSTALLING ROLL FEED UNIT



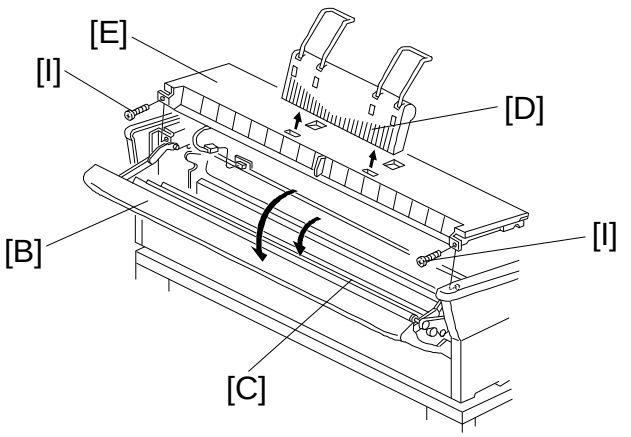
1. Pull out the stand rails (right [E] and left [F]) completely.
2. While aligning the positioning pins [G] (right and left: 2 each) with the holes [H], place the roll feed unit [I] on the rails.
3. Re-assemble the machine.

8. OTHERS

8.1 OZONE FILTER REPLACEMENT



A174R542.wmf



A174R543.wmf

NOTE: Take care not to damage the mylars [A] on the rear feed table.

1. Open the fusing exit cover [B] and exit unit [C].
2. Remove the copy tray [D].
3. Remove the rear feed table assembly [E] (2 screws and 1 connector).
4. Unhook the blower duct [F] and remove.
5. Unhook the fan support plate [G] and remove.
6. Replace the ozone filter [H].

   NOTE: When reinstalling the rear feed table assembly, fix the 2 screws [I] while pushing the assembly.

9. COPY QUALITY ADJUSTMENT

– General Information –

Image density is affected by the following factors:

(1) Light Intensity
(2) Bias Voltage
(3) Toner Density
(4) Grid Voltage
(5) Charge Corona Current

The items listed above must be kept in balance to maintain correct image density.

In the field, image density should be adjusted first by changing the light intensity. (Adjust the light sensor voltage.) If results are unsatisfactory, the bias voltage can be changed. Also, if requested by the customer, the overall image density can be changed by changing the toner density. Normally, this should be kept at the normal position (factory setting).

The grid voltage and charge corona current are carefully adjusted at the factory. Any adjustment out of the adjustment standards will result in over toning, toner scattering, dirty background, or light image density problems. The grid voltage and charge corona current adjustment should be done only when replacing the Charge/Bias/Grid power pack, or to correct certain problems with image density after checking all other possible causes.

9.1 LIGHT SENSOR ADJUSTMENT

When:	1. Every Call 2. When replacing the following part
	• Exposure lamp • Light sensor
	• Drum • RAM on the main board
Purpose:	To maintain the correct light intensity.
Adjustment Standard:	Level 2 (10%) of the 9 step gray scale on the OS-A1 chart should be slightly visible when the 7 manual image density level is selected.
Perform:	Change SP#-12 setting.
How:	Change the light sensor voltage.

1. Turn off the main switch.
2. Clean the following parts:

Item No.	Section	Method
(1)	Optics (Exposure glass, fiber optics array)	Damp cotton and dry soft cloth
(2)	Corona wires (charge, transfer and separation) and casing.	Dry cloth
(3)	PTL	Dry cloth or blower brush

3. Remove the middle right cover.
4. Make several copies at manual image density level 7 with OS-A1 chart.
5. Confirm that level 2 (10%) of the 9 step gray scale is slightly visible on the copy. If the copy image density is not correct, proceed with the following step.
6. Change SP#-12 setting in the SP mode.
   If the image density is too dark: Increase SP#-12 setting.
   If the image density is too light: Decrease SP#-12 setting.
7. Confirm that image density is within the adjustment standard.

9.2 IMAGE BIAS ADJUSTMENT

When:	1. The image is blurred even though the image density in black solid areas is acceptable.
	2. Dirty background, where the problem is not caused by excess toner and cannot be solved by adjusting the light sensor voltage.
Purpose:	To improve the copy image.
Perform:	SP#-25
How:	Change the development bias voltage for image density control by SP#-25.

SP#–25 3 Standard
0 ← 3 → 8
Darker Lighter

1. Make a copy after adjusting the light intensity.
2. If the image is blurred:
   Decrease bias voltage by one step and readjust light intensity.

   If the background is dirty:
   Increase bias voltage by one step and readjust light intensity.

9.3 TONER DENSITY ADJUSTMENT

When:	Customer wants to change the overall image density of the copies.
Purpose:	To change toner concentration inside development unit.
Perform:	SP#-9
How:	Change the toner density setting by SP#-9

NOTE: The toner density can also be adjusted using SP#-61 (toner density sensor voltage setting). To return SP#-61 to the initial value, take memo when the value is changed.

9.4 REGISTRATION ADJUSTMENT

When:	Registration is not within the adjustment standard.
Purpose:	To maintain proper registration.
Adjustment Standard:	0 ± 3 mm (0 ± 0.12")
Perform:	SP#-5
How:	Change the registration roller start timing by SP#-5.

1. Make several copies by using the manual feed or roll feeder and check the registration.
2. Adjust the registration using SP#-5 if the registration is not within the adjustment standard.

SECTION 6

TROUBLESHOOTING

1. COPY QUALITY TROUBLESHOOTING

1.1 LOW IMAGE DENSITY

Is the used paper moist or extremely dry?

No

Yes

Replace the paper.

Is the toner sensor voltage within the no toner supply level (level 0) ? (Refer to Page 2-20.)

Yes

No

Is there sufficient toner in the cartridge?

Yes

No

Replace the toner cartridge.

Is the toner supply clutch energized?

Yes

No

Check the main board and the toner supply clutch.

Does the toner sensor voltage decrease in the special toner supply mode (SP#64)?

Yes

No

Check the toner supply mechanism.

The amount of toner used exceeds the toner supply amount.

⇒Supply toner until the toner sensor voltage reaches the target value.

Is the solid black copy dark enough? (Make a solid black copy using SP#–81.)

Yes

No

Does the image density recover (without dirty background) after forcing supply of toner using SP#64?

Yes

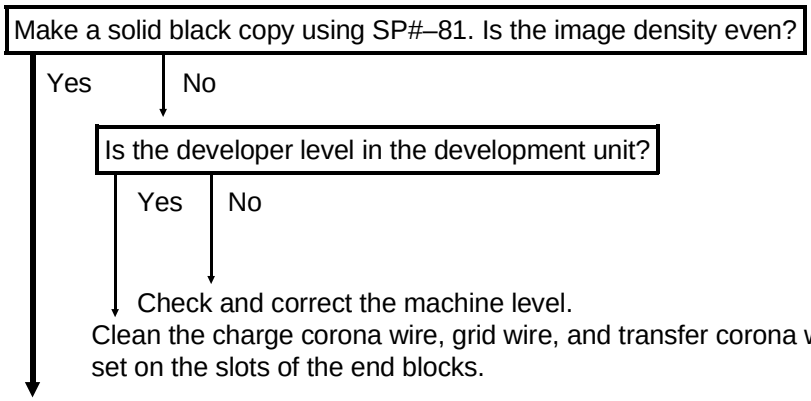
No

Check the charge corona, transfer corona and development bias.

Check the toner sensor and main board.

Check the light sensor, FL regulator and main board.

1.2 UNEVEN COPY IMAGE


Make a solid black copy using SP#–81. Is the image density even?
Yes
No
Is the developer level in the development unit?
Yes
No
Check and correct the machine level.

Clean the charge corona wire, grid wire, and transfer corona wire. Check if they are correctly set on the slots of the end blocks.

Clean the optics. If the problem is not fixed, replace the exposure lamp.

1.3 DIRTY BACKGROUND

Clean the optics and check the copy image.

No good

Change the light sensor setting to a lighter position using SP#–12.

No good

Is the bias voltage correct?

Yes / No

Adjust the bias voltage.

Is the toner sensor voltage much lower than the threshold between level 0 and 1? (Check using SP#–63 referring to Page 2-20.)

No / Yes

Check the main board and toner supply clutch.

Is the image density of solid areas high?

No / Yes

Check the toner sensor.

Make several blank copies. Is the background still dirty?

Yes / No

Check the cleaning blade.

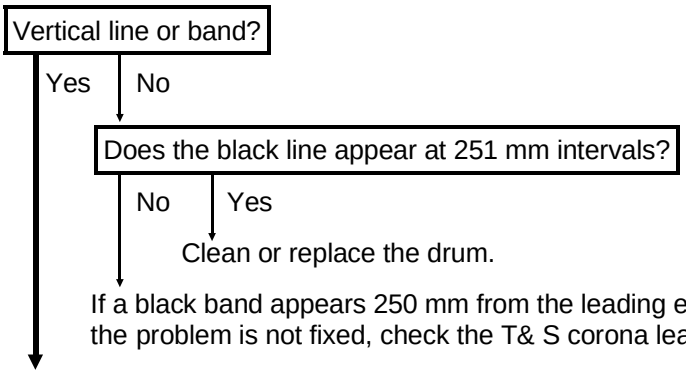
Are the grid voltage and the charge corona current correct?

Yes / No

Adjust the grid voltage and/or the charge corona current.

Replace the drum.

1.4 BLACK LINE OR BAND



If a black band appears 250 mm from the leading edge, turn the main switch off and on . If the problem is not fixed, check the T& S corona leakage. ***NOTE**

Check the part of the following items that corresponds to the position of the vertical line or band.

- Charge corona wire
- Grid wires
- Light path (Exposure lamp, fiber optics array, exposure glass)
- Cleaning blade
- Development unit
- Drum

NOTE: If the separation corona leakage is detected, the separation corona will be turned off. This condition will not be reset until the main switch is turned off and on. If the separation corona does not turn on, a black band appears 250 mm from the paper leading edge.

1.5 ENTIRELY BLANK COPY

Is the used paper moist?

No | Yes

Replace the paper.

Are the terminals of the charge corona unit and the T& S corona unit connected properly?

Yes | No

Set the terminals properly.

Is the charge corona wire or the T & S corona wire broken?

No | Yes

Replace the broken part.

Are the charge corona and transfer corona applied?

Yes | No

Check the main board, charge/bias/grid power pack, and T & S power pack.

Does leakage occur in the T & S endblocks?

No | Yes

Replace the defective parts.

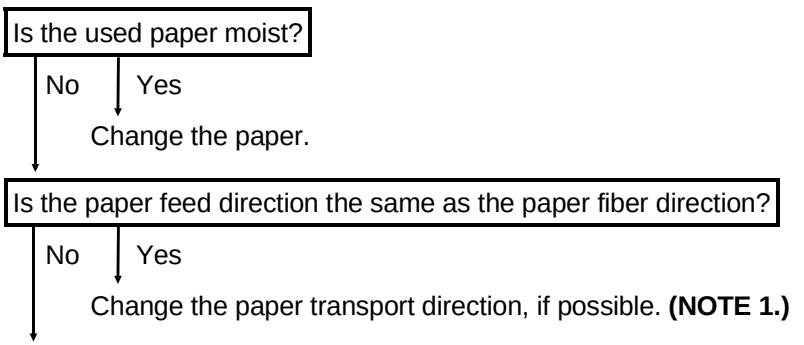
Are the development drive gears broken?

No | Yes

Replace the broken gears.

Check the drum drive mechanism.

1.6 PAPER CREASING


Is the used paper moist?
No
Yes
Change the paper.
Is the paper feed direction the same as the paper fiber direction?
No
Yes
Change the paper transport direction, if possible. **(NOTE 1.)**
Decrease the fusing temperature at the key operation (refer to 2-39). **(NOTE 2.)**

NOTE: 1) If there is rib shape creasing, the paper feed direction should be the same as the paper fiber direction.

2) After decreasing the fusing temperature, check if the image is completely fused on the paper.

2. SERVICE CALL CONDITION

When a service call condition occurs, the Call Service indicator and service call codes are displayed.
When the service call conditions E2, E3, E4, E5, E6, E7, E8 , and E15 conditions occur, for safety reason they cannot be cleared by turning the main switch off and on. Accessing SP41 and changing the date from "1" to "0" must be done to clear these service call conditions.

2.1 SC CODE E-1: EXPOSURE LAMP ABNORMAL

-Definition-

The light sensor voltage is less than 0.4 volts for 10 seconds.

<Points to check>

Exposure lamp

Light sensor

FL regulator (CN401-1, -2, -3)

Main board (CN102-B10, -B11, -B12 and CN105-B27, -B28, B29, -B30)

2.2 SC CODE E-2: FUSING THERMOFUSE OPEN

-Definition-

The temperature detected by the hot roller thermistor does not reach 100°C within 4 minutes and 30 seconds after the main switch is turned on.

<Point to check>

Fusing thermofuse

Hot roller thermistor

AC drive board (CN203-2, T203)

Main board (CN106, -A4, -A5, and CN102-A20)

2.3 SC CODE E-3: HOT ROLLER THERMISTOR OPEN

-Definition-

The temperature detected by the hot roller thermistor does not reach 50°C within 3 minutes after the main switch is turned on.

<Point to check>

Hot roller thermistor

AC drive board (CN203-2, T203)

Fusing thermofuse

Main board (CN106-A4, -A5, and CN102-A20)

2.4 SC CODE E-4: HOT ROLLER THERMISTOR SHORT

-Definition-

The resistance of the the hot roller thermistor is less than 0.11 KΩ.

<Point to check>

Hot roller thermistor

Main board (CN106-A4, CN102-A20)

2.5 SC CODE E-5: PRESSURE ROLLER THERMISTOR OPEN

-Definition-

The resistance of the pressure roller thermistor is more than 0.53 MΩ.

<Point to check>

Pressure roller thermistor

Main board (CN106-A6, -A7)

2.6 SC CODE E-6: PRESSURE ROLLER THERMISTOR SHORT

-Definition-

The resistance of the pressure roller thermistor is less than 0.55 KΩ.

<Point to check>

Pressure roller thermistor

Main board (CN106-A6, -A7))

2.7 SC CODE E-7: FUSING OVERHEAT

-Definition-

The temperature detected by the hot roller thermistor becomes higher than 220°C

<Point to check>

Hot roller thermistor

Fusing thermofuse

AC drive board (CN203-2, T203)

Main board (CN102-A20)

2.8 SC CODE E-8: FUSING WARM-UP ERROR

-Definition-

The temperature detected by the hot roller thermistor does not reach the target ready temperature within 12 minutes after main switch is turned on.

<Point to check>

Hot roller thermistor

Fusing lamp

Fusing thermofuse

AC drive board (CN203-2, T203)

Main board (CN102-A20)

AC harness

2.9 SC CODE E-9: TONER DENSITY SENSOR ABNORMAL

-Definition-

The toner density sensor voltage is less than 0.5 volts or more than 4.5 volts.

NOTE: 4.5 volts condition is not detected until 251 copies since initializing developer.

<Point to check>

Toner density sensor

Flow of the developer at the toner density sensor area

Main board (CN105-B15, -B16, -B17, -B18)

2.10 SC CODE E-10: MAIN MOTOR ABNORMAL

-Definition-

The main board does not receive a signal from the main motor for 2 seconds while the main motor is on.

<Point to check>

Main motor

Mechanical interference of the main motor drive

Main board (CN102-A8, -A9)

2.11 SC CODE E-11: DEVELOPMENT MOTOR ABNORMAL

-Definition-

1. Development motor does not output LOCK signal within 2 seconds after the motor is energized.
2. LOCK signal is not in LOW level before the development motor is energized.

<Point to check>

Development motor

Mechanical interference of the development motor

Main board (CN102-A5, -A7)

2.12 SC CODE E-12: CHARGE CORONA CLEANER MOTOR ABNORMAL

-Definition-

1. The over current of the charge corona wire drive motor is not detected continually for 1.5 seconds within 3 minutes after main switch is turned on.
2. The over current of the charge corona wire drive motor is not detected twice within 3 minutes after the charge corona motor is energized.

<Point to check>

Charge cleaner motor

Mechanical interference of the charge cleaner motor

2.13 SC CODE E-13: TOTAL COUNTER ABNORMAL

-Definition-

Total counter does not operate.

<Point to check>

Total counter and its connection.

2.14 SC CODE E-14: ZERO CROSS SIGNAL DETECTION ABNORMAL

-Definition-

The zero cross signal is not detected within 0.5 second after the main switch is turned on.

<Point to check>

Main board

AC Drive board

2.15 SC CODE E-15: MAIN SWITCH ABNORMAL (U.S.A version only)

-Definition-

The main switch does not turn off within 0.45 second after sending reset signal.

<Point to check>

Main Switch

Main board

2.16 SC CODE E-16: TONER DENSITY SENSOR ADJUSTMENT ERROR

-Definition-

The toner density sensor voltage cannot be adjusted to its standard value (4.1 ± 0.1 volts) during the new developer initialization.

NOTE: If clearing the SC condition, the previous data of SP#-61 is still used until its next initialization.

<Point to check>

Toner density sensor

Developer

Flow of the developer at the toner density sensor area

Main board (CN104-A10, -A11, -B20, -B21)

2.17 SC CODE E-17: ADS AUTO ADJUSTMENT FAILURE

-Definition-

The ADS sensor voltage cannot be adjusted to its standard value (3.9 ± 0.2 V) during the ADS auto adjustment (SP#–56).

<Point to check>

ADS pattern

ADS sensor

2.18 SC CODE E-18: ORIGINAL REGISTRATION AUTO ADJUSTMENT FAILURE

-Definition-

The original registration sensor voltage cannot be adjusted to its standard value (3 ± 0.2 V) during the original registration auto adjustment (SP#–50).

<Point to check>

Original registration sensor

3. BLOWN FUSE TABLE

3.1 POWER SUPPLY UNIT

Europe version

Fuse No.	Specification	Symptom
FU301	250V 5A	No power.
FU302	250V 6.3A	No indication and Beeper sounds if 2 or more fuses are blown.
FU303	250V 6.3A	
FU304	250V 6.3A	

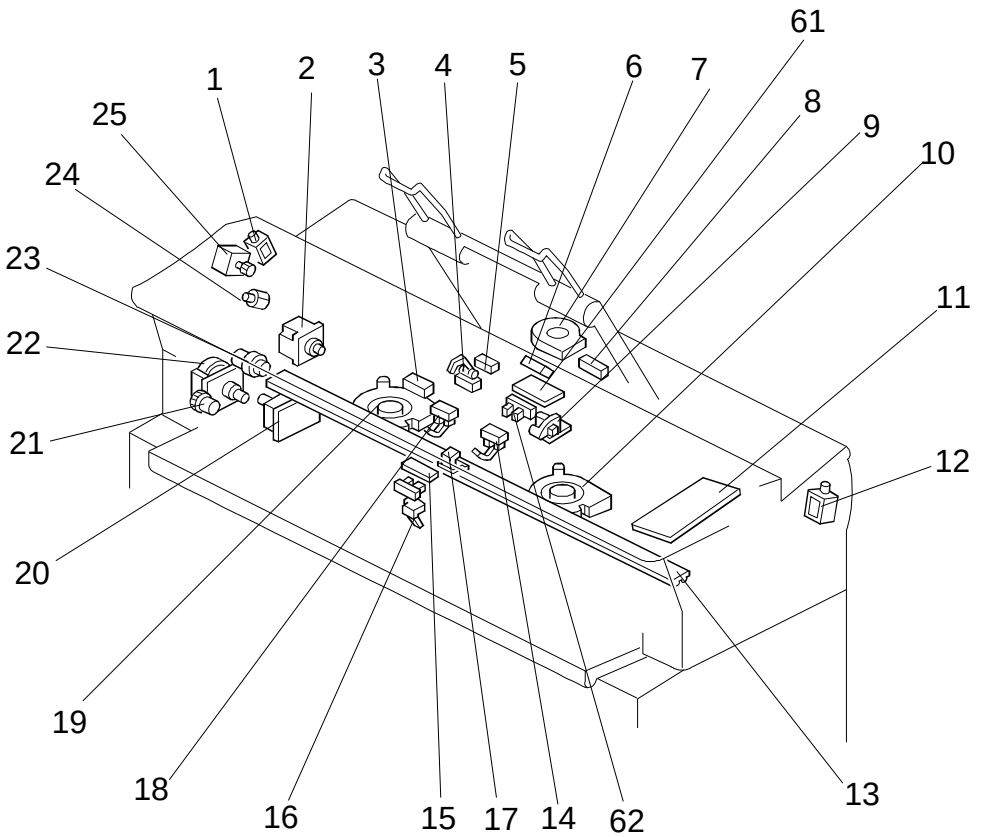
USA version

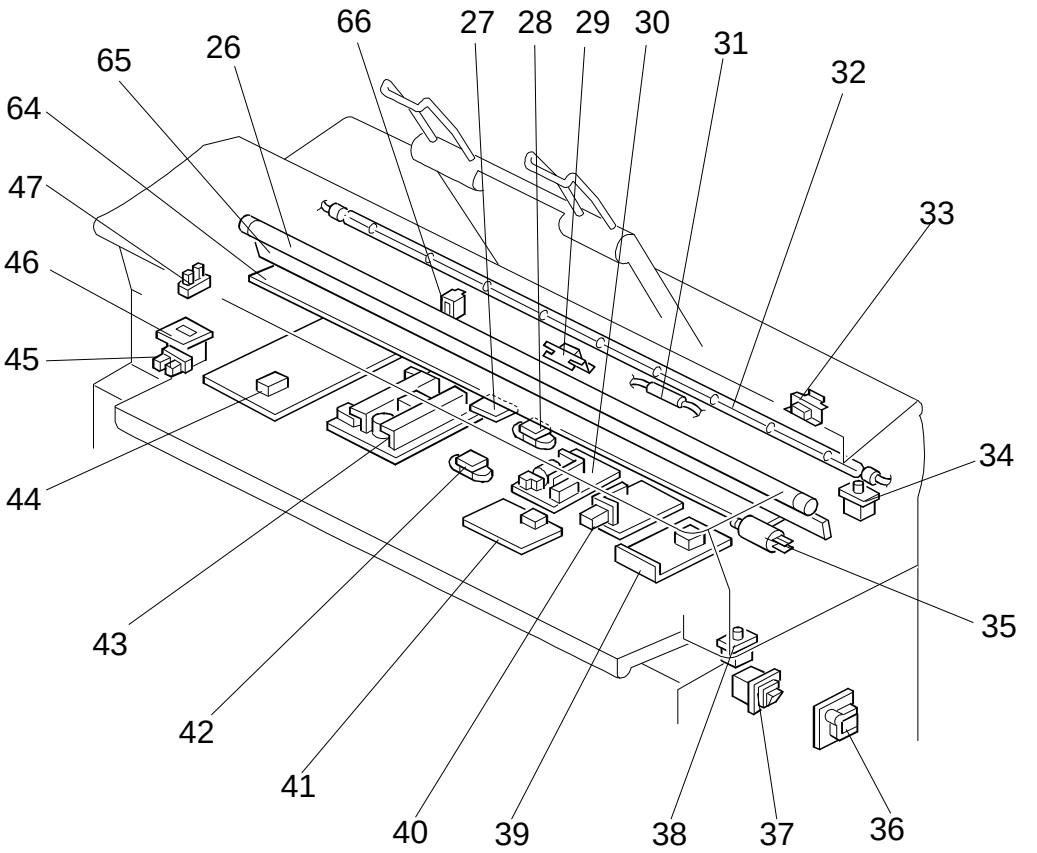
Fuse No.	Specification	Symptom
FU1	125V 8A	No power.
FU2	125V 6.3A	No indication and Beeper sounds if 2 or more fuses are blown.
FU3	125V 6.3A	
FU4	125V 6.3A	

AC Drive Board

Fuse No.	Specification	Symptom
F201	120V 15A (U.S.A. version only)	No power.
F202	250V 1A	No power is supplied to the anti-humidity heater

ELECTRICAL COMPONENT LAYOUT

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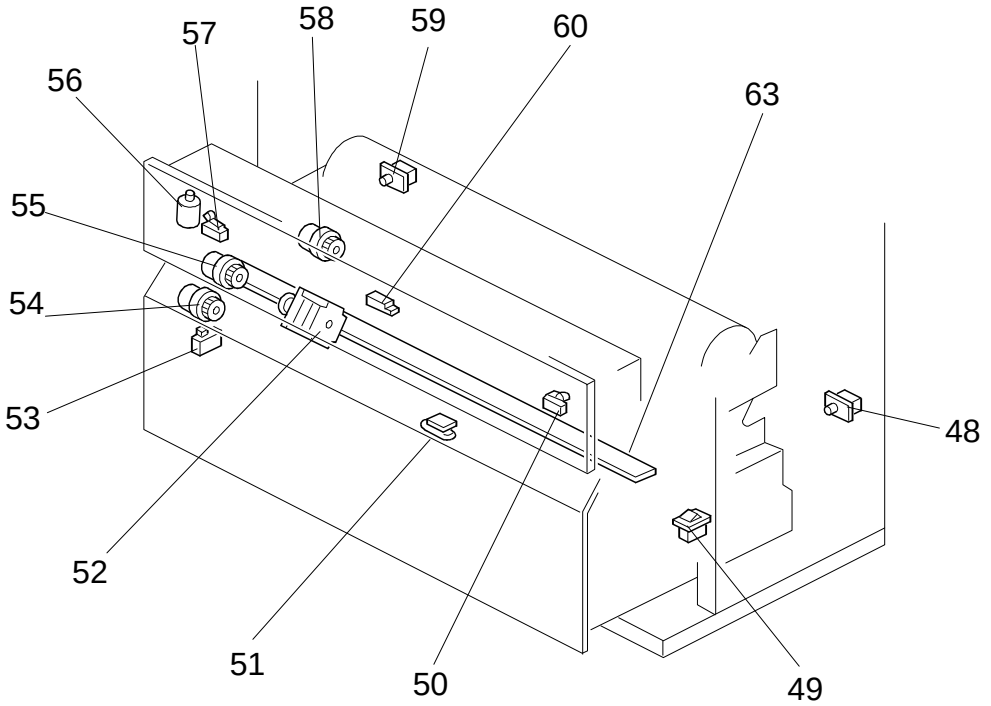
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